6.07 AMINO ACID FORMULA WITH VITAMINS AND MINERALS WITHOUT VALINE, LEUCINE AND ISOLEUCINE, Sachets containing oral powder 25 g, 30 (MSUD express 15), MSUD express 15®, Vitaflo Australia Pty Limited

6.08 AMINO ACID FORMULA WITH VITAMINS AND MINERALS WITHOUT VALINE, LEUCINE AND ISOLEUCINE AND SUPPLEMENTED WITH ARACHIDONIC ACID AND DOCOSAHEXAENOIC ACID, Sachets containing oral powder 12.5 g, 30 (MSUD Explore5), MSUD Explore5®, Vitaflo Australia Pty Limited

1 Purpose of Submission

1.1 The Category 3 submission requested a General Schedule Restricted Benefit listing of:

- amino acid formula with vitamins and minerals without valine, leucine and isoleucine (**MSUD express 15®**) sachets containing oral powder 25 g, and
- amino acid formula with vitamins and minerals without valine, leucine and isoleucine with long chain polyunsaturated fatty acids and supplemented with arachidonic acid and docosahexaenoic acid (**MSUD Explore5®**) sachets containing oral powder 12.5 g

For patients aged 3 years of age or older (**MSUD express 15**) and 6 months to 5 years (**MSUD Explore5**) with a proven diagnosis of either ECHS1 deficiency or HIBCH deficiency.

2 Background

2.1 Both **MSUD express 15** and **MSUD Explore5** are currently listed on the PBS as a General Schedule Restricted Benefit listing for patients with Maple Syrup Urine Disease (MSUD).

2.2 **MSUD express 15** and **MSUD Explore5** are valine-free protein substitutes. The submission claimed that valine-free protein substitutes are suitable for the dietary management of ESCH1 and HIBCH deficiencies.

Registration status

2.3 The submission confirmed that both **MSUD express 15** and **MSUD Explore5** meet the requirements for foods for medical purposes as set out under *The Australia New Zealand Food Standards Code – Standard 2.9.5: Food for Special Medical Purposes*.

2.4 As both **MSUD express 15** and **MSUD Explore5** are marketed as a nutritional product and not a therapeutic good, they are not registered in the Australian Register of Therapeutic Goods.

Previous PBAC consideration

2.5 **MSUD express 15** sachets containing oral powder 25 g and **MSUD Explore5** sachets containing oral powder 12.5 g have not been previously considered by the PBAC for the dietary management of ECHS1 deficiency and HIBCH deficiency.

3 Requested listing

3.1 The submission requested listing as per the current PBS listing for MSUD indications.

3.2 The submission sought quantities and repeats identical to those currently listed for **MSUD express 15** and **MSUD Explore5** for maple syrup urine disease (item codes: 8632H and 14118C). To facilitate future analysis of dispensing data and utilisation patterns, the Secretariat proposed that, if recommended, the new indications be listed under separate item codes.

3.3 The submission requested the following new listing for **MSUD express 15**. The Secretariat presented the requested listing in a restriction-based format.

*Add new indications to **MSUD express 15** as follows:*

MEDICINAL PRODUCT **medicinal product pack**	**PBS item code**	**Max. qty packs**	**Max. qty units**	**№.of Rpts**	**Available brands**
AMINO ACID FORMULA WITH VITAMINS AND MINERALS WITHOUT VALINE, LEUCINE, AND ISOLEUCINE					
amino acid formula with vitamins and minerals without valine, leucine and isoleucine powder for oral liquid, 30 x 25 g sachets	NEW	4	4	5	MSUD express 15
Restriction Summary [New 1]/ Treatment of Concept: [New 1a]: Restricted					
Concept ID	**Category / Program:** ☒ GENERAL - General Schedule (Code GE)				

	Prescriber type: ☒Medical Practitioners ☒Nurse practitioners
	Restriction type: ☒Restricted benefit
	Indication: Short-chain enoyl Co-A hydratase 1 (ECHS1) deficiency

MEDICINAL PRODUCT medicinal product pack	**PBS item code**	**Max. qty packs**	**Max. qty units**	**№.of Rpts**	**Available brands**
AMINO ACID FORMULA WITH VITAMINS AND MINERALS WITHOUT VALINE, LEUCINE, AND ISOLEUCINE					
amino acid formula with vitamins and minerals without valine, leucine and isoleucine powder for oral liquid, 30 x 25 g sachets	NEW	4	4	5	MSUD express 15
Restriction Summary [New 2]/ Treatment of Concept: [New 2a]: Restricted					
Concept ID	**Category / Program:** ☒ GENERAL - General Schedule (Code GE)				
	Prescriber type: ☒Medical Practitioners ☒Nurse practitioners				
	Restriction type: ☒Restricted benefit				
	Indication: 3-hydroxyisobutyryl Co-A hydrolase (HIBCH) deficiency				

3.4 The submission requested the following new listing for **MSUD Explore5**. The Secretariat presented the requested listing in a restriction-based format.

*Add new indications to **MSUD Explore5** as follows:*

MEDICINAL PRODUCT medicinal product pack	**PBS item code**	**Max. qty packs**	**Max. qty units**	**№.of Rpts**	**Available brands**
AMINO ACID FORMULA WITH VITAMINS AND MINERALS WITHOUT VALINE, LEUCINE, AND ISOLEUCINE AND SUPPLEMENTED WITH ARACHIDONIC ACID AND DOCOSAHEXAENOIC ACID					
amino acid formula with vitamins and minerals without valine, leucine, isoleucine and supplemented with arachidonic acid and docosahexaenoic acid containing 5 g of protein equivalent powder for oral liquid, 30 x 12.5 g sachets	NEW	8	8	5	MSUD Explore5
Restriction Summary [New 1]/ Treatment of Concept: [New 1a]: Restricted					
Concept ID	**Category / Program:** ☒ GENERAL - General Schedule (Code GE)				
	Prescriber type: ☒Medical Practitioners ☒Nurse practitioners				
	Restriction type: ☒Restricted benefit				
	Indication: Short-chain enoyl Co-A hydratase 1 (ECHS1) deficiency				

MEDICINAL PRODUCT medicinal product pack	**PBS item code**	**Max. qty packs**	**Max. qty units**	**№.of Rpts**	**Available brands**
AMINO ACID FORMULA WITH VITAMINS AND MINERALS WITHOUT VALINE, LEUCINE, AND ISOLEUCINE AND SUPPLEMENTED WITH ARACHIDONIC ACID AND DOCOSAHEXAENOIC ACID					

amino acid formula with vitamins and minerals without valine, leucine, isoleucine and supplemented with arachidonic acid and docosahexaenoic acid containing 5 g of protein equivalent powder for oral liquid, 30 x 12.5 g sachets	NEW	8	8	5	MSUD Explore5
Restriction Summary [New 2]/ Treatment of Concept: [New 2a]: Restricted					
Concept ID	**Category / Program:** ☒ GENERAL - General Schedule (Code GE)				
	Prescriber type: ☒Medical Practitioners ☒Nurse practitioners				
	Restriction type: ☒Restricted benefit				
	Indication: 3-hydroxyisobutyryl Co-A hydrolase (HIBCH) deficiency				

4 Comparator

4.1 The submission considered a low valine diet without inclusion of valine free protein substitute as the closest comparator for **MSUD express 15** and **MSUD Explore5.**

4.2 The submission claimed there are no nutritional products listed on the PBS for use in the dietary management of ECHS1 deficiency and HIBCH deficiency and that the current PBS listings for **MSUD express 15** and **MSUD Explore5** are restricted to use in patients with protein metabolism disorders, including MSUD. The Secretariat noted dietary management as the main comparator may be appropriate in the absence of a PBS-listed nutritional product for use in ECHS1 and HIBCH deficiencies.

5 Consideration of the evidence

Sponsor hearing

5.1 There was no hearing for this item.

Consumer Inputs

5.2 The PBAC noted that no consumer inputs were received for this item.

Population

5.3 The submission stated that there is currently an extremely small number of patients who would commence therapy for ECHS1 deficiency and HIBCH deficiency. The submission stated that, at the time of submission, there are no patients with HIBCH deficiency and there is one known patient with ECHS1 deficiency in Australia.

Equity and Access Considerations

5.4 The submission stated there is strong support from health care professionals for listing **MSUD express 15** and **MSUD Explore5** on the PBS for ESCH1 deficiency and HIBCH deficiency. The submission noted that while there is not currently a known patient in

Australia with HIBCH deficiency, it is logical to make the submission for HIBCH deficiency at the same time as the submission for ECHS1 deficiency.

5.5 The submission stated that clinicians consider a valine restricted diet (including use of valine free protein substitute) for ECHS1 to be currently limited, primarily due to access to valine free protein substitute. The submission stated that current access to **MSUD express 15** and **MSUD Explore5** for the dietary treatment of ECHS1 deficiency is restrictive, costly, and may result in in delayed commencement of dietary treatment, abandonment of dietary therapy or no attempt at dietary therapy, which may compromise health outcomes.

Clinical evidence

5.6 The submission did not provide clinical trial or study data for either **MSUD express 15** or **MSUD Explore5**. The submission referenced 2 clinical reviews, 3 single case reports, and included information from recommendations for managing these conditions.

5.7 The submission claimed that undertaking clinical trials in an extremely small patient population would be difficult and place the patients at high risk for medical complications and growth retardation.

5.8 The submission referenced a recent study that concluded that a valine restricted diet appeared beneficial for patients with ESCH1 and HIBCH deficiencies. The submission referenced single case reports describing the clinical outcomes for a small number of patients with HIBCH deficiency and one patient with ESCH1 deficiency with 'limited results.'[1,2,3]

5.9 The submission referred to 2 clinical reviews on the management of HIBCH deficiency. The reviews concluded that a valine restricted diet appears to be beneficial for patients with HIBCH, improving the biochemical and clinical manifestations of these disorders.

5.10 The Secretariat noted the single case reports and clinical reviews demonstrate that valine restricted diets may have the potential for safe and efficacious management and clinical improvement of ESCH1 and HIBCH deficiencies.

---

[1] Xu Y, Zhang J, Yu K, Feng F, Sun X, Li C, et al. A therapeutic regimen for 3-hydroxyisobutyryl-CoA hydrolase deficiency with exercise-induced dystonia. In: European Journal of Paediatric Neurology [Internet]. 2018;22(2):321–326. Available from: https://doi.org/10.1016/j.ejpn.2017.11.004

[2] Soler-Alfonso C, Enns GM, Koenig MK, Saavedra H, Bonfante-Mejia E, Northrup H. Identification of HIBCH gene mutations causing autosomal recessive Leigh syndrome: a gene involved in valine metabolism. In: Pediatric Neurology [Internet]. 2015;52(1):128–130. Available from: https://doi.org/10.1016/j.pediatrneurol.2014.10.023

[3] Shayota BJ, Soler-Alfonso C, Bekheirnia MR, Mizerik E, Boyer SW, Xiao R, et al. Case report and novel treatment of an autosomal recessive Leigh syndrome caused by short-chain enoyl-CoA hydratase deficiency. In: American Journal of Medical Genetics Part A [Internet]. 2019;179(6):910–914. Available from: https://doi.org/10.1002/ajmg.a.61074

Place in treatment

5.11 The submission stated that current treatments for ECHS1 and HIBCH deficiencies are mainly supportive and coordinated by a multi-disciplinary team of specialists. The submission stated that for valine catabolism disorders (such as MSUD), treatment includes dietary intervention aimed at reducing accumulation of toxic metabolites.

5.12 The submission noted that although valine-restricted diet as a treatment option for ECHS1 and HIBCH deficiencies has not been thoroughly studied, recommendations for managing HIBCH deficiency via a restricted valine diet, including use of valine free protein substitute, have recently been published. The submission stated that while there is evidence of successful response to a valine-restricted diet for the management of ECHS1 deficiency, there are currently no specific recommendations on the treatment for this indication. The submission considered this is likely due to the disorder's recent discovery.

Clinical claim

5.13 The submission stated that it is 'common sense' that elimination of high protein foods from the diet (i.e. through a valine restricted diet), without protein substitute would place patients with ECHS1 deficiency and HIBCH deficiency at high risk of growth failure, highlighting the need for valine free protein substitutes such as **MSUD express 15** and **MSUD Explore5**.

5.14 The submission claimed that both **MSUD express 15** and **MSUD Explore5** are suitable for use in the dietary management of ECHS1 deficiency and HIBCH deficiency.

5.15 The submission stated that **MSUD express 15** and **MSUD Explore5** have been used safely and efficaciously in the dietary management of patients with MSUD in Australia for 23 and 22 years, respectively. The submission considered that, despite differences between ECHS1/HIBCH deficiencies and MSUD, **MSUD express 15** and **MSUD Explore5** are expected to be safe and efficacious as part of dietary management for patients with ECHS1 and HIBCH deficiencies.

5.16 The Secretariat noted that the product inserts for **MSUD express 15** and **MSUD Explore5** do not include ECHS1 deficiency or HIBCH deficiency as an indication.

5.17 The Secretariat noted the submission did not include inferiority/non-inferiority/superiority claims regarding the comparative effectiveness and safety of **MSUD express 15** nor **MSUD Explore5**.

Pricing and considerations

5.18 As a Category 3 submission, the economic analysis was not independently evaluated.

5.19 The submission requested listing of both **MSUD express 15** and **MSUD Explore5** at the established price per gram of protein equivalent compared to the **MSUD express 15** and **MSUD Explore5** PBS listing indicated for MSUD. The requested pricing structure of **MSUD Explore5** and **MSUD express 15** is presented in Table 1.

Table 1: Pricing Structure for MSUD express 15 and MSUD Explore5 for ECHS1 deficiency and HIBCH deficiency

	MSUD Explore5 Price $	**MSUD express 15 Price $**
AEMP (per carton)	$199.82 (150 g PE)	$599.44 (450 g PE)
AEMP (per max qty)	$199.82 x 8 = $1,598.56 (1,200 g PE)	$599.44 x 4 = $2,397.76 (1,800 g PE)
Wholesaler Mark Up (7.52%)	+$52.16	+$54.16
Price to Pharmacy	$1,652.72	$2,451.92
Pharmacy Mark up and Dispensing Fee	+$91.44	+$108.80
DPMQ	**$1,744.16**	**$2,560.72**

Abbreviations: PE: protein equivalent, AEMP: Approved ex-manufacturer price, DPMQ: dispensed price for maximum quantity
Source: p17 of sponsor submission Main Body

MSUD express 15 cost/patient/year: $30,728.64

5.20 The submission claimed the estimated cost per patient per year for **MSUD express 15** for ECHS1 and HIBCH deficiency would be $30,728.64, based on the assumptions that one patient uses an average of 4 cartons per prescription and 12 prescriptions per year ($2,560.72 x 12 = $30,728.64).

5.21 The Secretariat noted that the estimated use and financial implications have been calculated by averaging the utilisation of one patient across **MSUD express 15** and **MSUD Explore5** to achieve 6 prescriptions per patient per year for both nutritional products. *See Section 6: Estimated PBS usage and financial implications.*

MSUD Explore5 cost/patient/year: $20,929.92

5.22 The submission claimed the estimated cost per patient per year for **MSUD Explore5** for ECHS1 and HIBCH deficiency would be $20,929.92, based on the assumptions that one patient uses an average of 8 cartons per prescription and 12 prescriptions per year ($1,744.16 x 12 = $20,929.92).

5.23 The Secretariat noted that the estimated use and financial implications have been calculated by averaging the utilisation of one patient across **MSUD express 15** and **MSUD Explore5** to achieve 6 prescriptions per patient per year for both nutritional products. *See Section 6: Estimated PBS usage and financial implications.*

6 Estimated PBS usage and financial implications

6.1 The submission claimed that due to the extremely rare nature of ECHS1 deficiency and HIBCH deficiency, it is expected that the sales of **MSUD express 15** and **MSUD Explore5** for these indications would only result in a slight increase to overall sales for these products.

6.2 The estimate models provided for **MSUD Explore5** and **MSUD express 15** adopted a market share approach, based on the current PBS listing of **MSUD Explore5** and **MSUD express 15** for different indications as a proxy to estimate the utilisation for the proposed indications.

- **MSUD Explore5**: assuming no growth and a 200% proportion to the current market to forecast the prescription volume.
- **MSUD express 15**: assuming no growth and a 3.66% of the current market to forecast the prescription volume.

6.3 The Secretariat considered this approach is over simplified and lacks a clear clinical basis and may not reflect the targeted patient population aged 6 months to 5 years for **MSUD Explore 5** and over 3 years for **MSUD express 15**.

MSUD express 15

6.4 The submission estimated that < 500 scripts would be supplied for **MSUD express 15** over the first six years of listing (6 in each year from Year 1 to 6, Table 2). The estimated net financial impact to the PBS/RPBS for the listing of **MSUD express 15** is $91,715 over six years (Year 1 $15,286 to Year 6 $15,286). The financial impact to Services Australia will be determined by that agency as part of the post PBAC process.

6.5 The estimated extent of use, cost of **MSUD express 15** to the PBS and the net financial implication to the PBS is presented in Table 2.

Table 2: Estimated use and financial implications of MSUD express 15

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Estimated extent of use						
Number of scripts dispensed[a]	[redacted][1]	[redacted][1]	[redacted][1]	[redacted][1]	[redacted][1]	[redacted][1]
Estimated financial implications of MSUD express 15						
Cost to PBS/RPBS less co-payment	$[redacted][2]	$[redacted][2]	$[redacted][2]	$[redacted][2]	$[redacted][2]	$[redacted][2]
Net financial implications						
Net cost to PBS/RPBS	$[redacted][2]	$[redacted][2]	$[redacted][2]	$[redacted][2]	$[redacted][2]	$[redacted][2]

[a] Assuming 12 scripts per patient per year as estimated by the submission.
Abbreviations: MBS = Medical Benefits Scheme; PBS = Pharmaceutical Benefits Scheme; RPBS = Repatriation Pharmaceutical Benefits Scheme.
Source: p18 of sponsor submission Main Body
The redacted values correspond to the following ranges:
[1] *< 500*
[2] *$0 to < $10 million*

MSUD Explore5

6.6 The submission estimated that 36 scripts would be supplied of **MSUD Explore5** over the first six years of listing (6 in each year from Year 1 to 6, Table 3). The estimated net financial impact to the PBS/RPBS for the listing of MSUD express 15 is $0 to < $10 million over six years (Year 1 $0 to < $10 million to Year 6 $0 to < $10 million). The financial impact to Services Australia will be determined by that agency as part of the post PBAC process.

6.7 The estimated extent of use, cost of **MSUD Explore5** to the PBS and the net financial implication to the PBS is presented in Table 3.

Table 3: Estimated use and financial implications of MSUD Explore5

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Estimated extent of use						
Number of scripts dispensed[a]	[redacted][1]	[redacted][1]	[redacted][1]	[redacted][1]	[redacted][1]	[redacted][1]
Estimated financial implications of MSUD express 15						
Cost to PBS/RPBS less co-payment	$[redacted][2]	$[redacted][2]	$[redacted][2]	$[redacted][2]	$[redacted][2]	$[redacted][2]
Net financial implications						
Net cost to PBS/RPBS	$[redacted][2]	$[redacted][2]	$[redacted][2]	$[redacted][2]	$[redacted][2]	$[redacted][2]

[a] Assuming 12 scripts per patient per year as estimated by the submission.
Abbreviations: MBS = Medical Benefits Scheme; PBS = Pharmaceutical Benefits Scheme; RPBS = Repatriation Pharmaceutical Benefits Scheme.
Source: p18 of sponsor submission Main Body
The redacted values correspond to the following ranges:
[1] *< 500*
[2] *$0 to < $10 million*

7 NPWP consideration

7.1 The NPWP supported the General Schedule Restricted Benefit listing of MSUD express 15 and MSUD Explore5 on the PBS for patients aged 3 years of age or older (MSUD express 15) and patients aged 6 months to 5 years (MSUD Explore5) with a proven diagnosis of either ECHS1 deficiency or HIBCH deficiency.

7.2 The NPWP considered it was appropriate to include HIBCH in this submission. The NPWP noted that while there are no patients currently diagnosed with this condition in Australia, it is reasonable to expect patient numbers to increase in the medium to long term due to known epidemiology of the disease and birth incidence expected per year.

7.3 The NPWP considered that there is a clinical need for nutritional supplements for the dietary management of ECHS1 and HIBCH deficiencies. The NPWP considered that MSUD express 15 and MSUD Explore5 are suitable, safe and efficacious for the dietary management of these deficiencies.

7.4 The NPWP considered the suggested maximum quantity and number of repeats of PBS listed MSUD express 15 and MSUD Explore5 would be appropriate for the dietary management of ECHS1 and HIBCH deficiencies.

7.5 The NPWP noted that the current standard of care for ECHS1 and HIBCH deficiencies includes a low valine diet with supplementation as needed, and considered a low valine diet was an appropriate comparator for MSUD express 15 and MSUD Explore5. The NPWP noted this treatment is monitored and adjusted by metabolic specialists. The NPWP noted that dietary management similar to that used for Methylmalonic Acidaemia (MMA) and Propionic Acidaemia (PA) with supplementation (such as MMA/PA Anamix Infant and MMA/PA Anamix Junior) could also be used as dietary management of ECHS1 and HIBCH deficiencies but may require supplementation of methionine, threonine and isoleucine either through natural protein sources or amino acid supplements.

7.6 The NPWP considered it would be beneficial to include ECHS1 and HIBCH deficiencies as indications in the product label, however this was not a requirement.

7.7 The NPWP considered that the submission estimates of current patient populations with ECHS1 and HIBCH deficiencies were reasonable, however noted that the submission estimates of future patient populations did not incorporate any patient growth. The NPWP noted that, due to known epidemiology of the disease and improvements in genetic testing and specificity, there are likely to be more patients than what the submission has stated, particularly in the medium to long term. The NPWP noted that patients may be misdiagnosed or diagnosed late due to variation of severity, and that more patients may be identified with improvements in genetic testing. The NPWP considered that an increase in population with both ECHS1 and HIBCH is likely to have minimal impact on PBS expenditure.

8 PBAC Outcome

8.1 The PBAC recommended:

8.2 The General Schedule Restricted Benefit listing of amino acid formula with vitamins and minerals without valine, leucine and isoleucine (**MSUD express 15®**) sachets containing oral powder 25 g for patients with a proven diagnosis of either Short-chain Enoyl co-A Hydratase 1 (ECHS1) deficiency and 3-Hydroxyisobutyryl co-A Hydrolase (HIBCH) deficiency.

- The General Schedule Restricted Benefit listing of amino acid formula with vitamins and minerals without valine, leucine and isoleucine with long chain polyunsaturated fatty acids and supplemented with arachidonic acid and docosahexaenoic acid (**MSUD Explore5®**) sachets containing oral powder 12.5 g for patients with a proven diagnosis of either ECHS1 deficiency and HIBCH deficiency.

8.3 The PBAC noted that the General Schedule Restricted Benefit listings of MSUD express 15 and MSUD Explore5 should be under the same circumstances and price as the existing listing of these products for Maple Syrup Urine Disease (MSUD).

8.4 The PBAC noted and supported the NPWP advice that the maximum quantity and number of repeats of PBS listed MSUD express 15 and MSUD Explore5 would be appropriate for the dietary management of ECHS1 and HIBCH deficiencies. The PBAC considered the listing of MSUD express 15 and MSUD Explore5 for these indications should be in line with the current PBS conditions of the MSUD indication, including permitting prescribing by nurse practitioners.

8.5 The PBAC noted and supported the NPWP advice that a low valine diet is an appropriate comparator.

8.6 The PBAC noted and supported the advice from the NPWP that the clinical claims in the submission are appropriate and that MSUD express 15 and MSUD Explore5 are adequate for the dietary management of these ESCH1D and HIBCH, highlighting that while there are alternative therapies that can be used for the dietary management of these deficiencies, it would be beneficial to have multiple PBS listed nutritional products for these indications.

8.7 The PBAC considered that while the sponsor's financial estimates and forecasting were oversimplified and did not account for population growth, they were acceptable and considered the financial impact to the PBS to be reasonable. The PBAC noted the NPWP advice that while the patient population group may increase over time, it is still likely to be small and have minimal impact on PBS expenditure. The PBAC noted that it should be made aware if there is a significant increase in patient population.

8.8 The PBAC advised that, because MSUD express 15 and MSUD Explore5 are not expected to provide a substantial and clinically relevant improvement in efficacy, or reduction of toxicity, over alternative therapies, and not expected to address a high and urgent unmet clinical need given the presence of an alternative therapy, the criteria prescribed by the *National Health (Pharmaceuticals and Vaccines – Cost Recovery) Regulations 2022* for Pricing Pathway A were not met.

8.9 The PBAC noted that this submission is not eligible for an Independent Review as it received a positive recommendation.

Outcome:
Recommended

9 Recommended Listing

9.1 Add new indications to **MSUD express 15** as follows:

MEDICINAL PRODUCT medicinal product pack	PBS item code	Max. qty packs	Max. qty units	№.of Rpts	Available brands
AMINO ACID FORMULA WITH VITAMINS AND MINERALS WITHOUT VALINE, LEUCINE, AND ISOLEUCINE					
amino acid formula with vitamins and minerals without valine, leucine and isoleucine powder for oral liquid, 30 x 25 g sachets	NEW	4	4	5	MSUD express 15
Restriction Summary [New 1]/ Treatment of Concept: [New 1a]: Restricted					
Concept ID	**Category / Program:** ☒ GENERAL - General Schedule (Code GE)				
	Prescriber type: ☒Medical Practitioners ☒Nurse practitioners				
	Restriction type: ☒Restricted benefit				
	Indication: Short-chain enoyl Co-A hydratase 1 (ECHS1) deficiency				

MEDICINAL PRODUCT medicinal product pack	PBS item code	Max. qty packs	Max. qty units	№.of Rpts	Available brands
AMINO ACID FORMULA WITH VITAMINS AND MINERALS WITHOUT VALINE, LEUCINE, AND ISOLEUCINE					
amino acid formula with vitamins and minerals without valine, leucine and isoleucine powder for oral liquid, 30 x 25 g sachets	NEW	4	4	5	MSUD express 15
Restriction Summary [New 2]/ Treatment of Concept: [New 2a]: Restricted					
Concept ID	**Category / Program:** ☒ GENERAL - General Schedule (Code GE)				
	Prescriber type: ☒Medical Practitioners ☒Nurse practitioners				
	Restriction type: ☒Restricted benefit				
	Indication: 3-hydroxyisobutyryl Co-A hydrolase (HIBCH) deficiency				

9.2 Add new indications to **MSUD Explore5** as follows:

MEDICINAL PRODUCT medicinal product pack	**PBS item code**	**Max. qty packs**	**Max. qty units**	**№.of Rpts**	**Available brands**
AMINO ACID FORMULA WITH VITAMINS AND MINERALS WITHOUT VALINE, LEUCINE, AND ISOLEUCINE AND SUPPLEMENTED WITH ARACHIDONIC ACID AND DOCOSAHEXAENOIC ACID					
amino acid formula with vitamins and minerals without valine, leucine, isoleucine and supplemented with arachidonic acid and docosahexaenoic acid containing 5 g of protein equivalent powder for oral liquid, 30 x 12.5 g sachets	NEW	8	8	5	MSUD Explore5

Restriction Summary [New 1]/ Treatment of Concept: [New 1a]: Restricted	
Concept ID	**Category / Program:** ☒ GENERAL - General Schedule (Code GE)
	Prescriber type: ☒Medical Practitioners ☒Nurse practitioners
	Restriction type: ☒Restricted benefit
	Indication: Short-chain enoyl Co-A hydratase 1 (ECHS1) deficiency

MEDICINAL PRODUCT medicinal product pack	**PBS item code**	**Max. qty packs**	**Max. qty units**	**№.of Rpts**	**Available brands**
AMINO ACID FORMULA WITH VITAMINS AND MINERALS WITHOUT VALINE, LEUCINE, AND ISOLEUCINE AND SUPPLEMENTED WITH ARACHIDONIC ACID AND DOCOSAHEXAENOIC ACID					
amino acid formula with vitamins and minerals without valine, leucine, isoleucine and supplemented with arachidonic acid and docosahexaenoic acid containing 5 g of protein equivalent powder for oral liquid, 30 x 12.5 g sachets	NEW	8	8	5	MSUD Explore5

Restriction Summary [New 2]/ Treatment of Concept: [New 2a]: Restricted	
Concept ID	**Category / Program:** ☒ GENERAL - General Schedule (Code GE)
	Prescriber type: ☒Medical Practitioners ☒Nurse practitioners
	Restriction type: ☒Restricted benefit
	Indication: 3-hydroxyisobutyryl Co-A hydrolase (HIBCH) deficiency

These restrictions may be subject to further review. Should there be any changes made to the restriction the sponsor will be informed.

10 Context for Decision

The PBAC helps decide whether and, if so, how medicines should be subsidised through the Pharmaceutical Benefits Scheme (PBS) in Australia. It considers applications regarding the listing of medicines on the PBS and provides advice about other matters relating to the operation of the PBS in this context. A PBAC decision in relation to PBS listings does not necessarily represent a final PBAC view about the merits of the medicine or the circumstances in which it should be made available

through the PBS. The PBAC welcomes applications containing new information at any time.

11 Sponsor's Comment

The sponsor had no comment.