National Institute for Health and Care Excellence

Final

Self-harm: assessment, management and preventing recurrence

[J] Evidence reviews for psychological and psychosocial interventions

NICE guideline number NG225

Evidence reviews underpinning recommendations 1.11.1 to 1.11.10 and research recommendation 4 in the NICE guideline

September 2022

Final

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Psychological and psychosocial interventions

Review question

What psychological and psychosocial interventions (including safety plans and electronic health-based interventions) are effective for people who have self-harmed?

Introduction

People who self-harm or engage in suicidal behaviour are often in distress and may benefit from effective psychological or psychosocial support to help reduce distress and repeat self-harm or suicide in the future. There is often limited availability of psychological and psychosocial interventions targeted for this group of people and they may be excluded from generic psychological therapy services. Determining which interventions are effective for children and young people and for adults is therefore important so that evidence-based psychological and psychosocial interventions can be commissioned and offered. The aim of this review is to find out what psychological and psychosocial interventions are effective for people who have self-harmed.

Summary of the protocol

See **Error! Reference source not found.** for a summary of the Population, Intervention, Comparison and Outcome (PICO) characteristics of this review.

Table 1: Summary of the protocol (PICO table)

Population	Inclusion: Children, adolescents and adults who had engaged in any type of non-fatal intentional self-poisoning or self-injury in the six months prior to trial entry resulting in presentation to clinical services. Exclusion: • Children, adolescents and adults who had presented to clinical services as a result of repetitive stereotypical self-injurious behaviours, for example, head-banging in people with a significant learning disability. • Trials where only some people had engaged in self-harm or where self-harm was an outcome variable, but not an inclusion criteria for entry into the trial.
Intervention	Any psychological and psychosocial interventions, for example: • Cognitive behavioural therapy-based psychotherapy • Dialectical behaviour therapy • Mentalisation-based therapy • Interventions for patients with multiple episodes of self-harm of emerging personality problems • Case management

	• Family interventions • Group-based psychotherapy • Enhanced assessment approaches • Treatment adherence enhancement approaches • Home-based family interventions • Remote contact interventions • Mixed multimodal interventions • Other mixed interventions Exclusion: Psychological and psychosocial intervention for any mental health problems or substance use disorders that may be associated with self-harm
Comparison	• Routine/standard care (defined as service provision that the patient would receive had they not been included in the study) • Enhanced usual care (for example, provision of psychoeducation) • Treatment by expert • Lower duration/intensity psychotherapy (for example, brief or short-term psychotherapy, dialectical behaviour therapy)
Outcome	**Critical** • Occurrence/repetition of self-harm (measured by self/collateral report, clinical records or research monitoring) • Proportion of participants repeating self-harm • Frequency of self-harm (measured by self/collateral report, clinical records or research monitoring) • Time to self-harm Maximum follow-up period of 2 years. This will be grouped into: at conclusion of the treatment period, 0-6 months after the conclusion of treatment, 6-12 months after the conclusion of treatment, 12-24 months after the conclusion of treatment. **Important** • Treatment adherence (using a range of measures, e.g proportion of participants who started and completed treatment, pill counts, changes in blood pressure) • Depression (measured continuously by psychometric assessments or dichotomously as proportion reaching defined diagnostic criteria) • Hopelessness (measured by psychometric assessments) • General functioning (measured by psychometric assessments) • Social functioning (measured by psychometric assessments)

	• Suicidal ideation (measured continuously by psychometric assessments or dichotomously as proportion reaching defined cut-off for ideation) • Suicide (measured by register recorded deaths and collateral report) Maximum follow-up period of 2 years. This will be grouped into: at conclusion of the treatment period, 0-6 months after the conclusion of treatment, 6-12 months after the conclusion of treatment, 12-24 months after the conclusion of treatment.

For further details see the review protocol in appendix A.

Methods and process

During the development of this guideline, two registered Cochrane protocols were identified which matched the committee's intended PICOs. The Cochrane protocols differed from the committee's intended population in that the Cochrane protocols excluded studies that included people who had self-harmed who had a neurodevelopmental disorder or learning difficulty, however no studies were identified that were excluded from the reviews on these grounds alone.

The Cochrane review team completed two reviews investigating the effectiveness of psychosocial interventions in adults (Witt 2021a) and psychosocial and pharmacological interventions in children and young people (CYP) (Witt 2021b) during guideline development and presented their results to the guideline committee, which used them to make recommendations. Cochrane's methods are closely aligned to standard NICE methods, minor deviations (the use of GRADE only on main outcomes with no overall quality rating for those with zero events in either arm, summary of findings tables instead of full GRADE tables, defining primary and secondary outcomes as opposed to critical and important and including countries from a broader range of income categories than the majority of the other reviews in the guideline) relevant to the topic area were highlighted to the committee and taken into account in discussions of the evidence.

Declarations of interest were recorded according to NICE's conflicts of interest policy.

Effectiveness evidence

Included studies

Two Cochrane reviews (Witt 2021a, Witt 2021b) including 83 randomised controlled trials were considered in this report. Of the studies included in these reviews, 76 were from the review investigating psychosocial interventions for adults (Allard 1992, Amadéo 2015, Andreoli 2015, Armitage 2016, Bateman 2009, Beautrais 2010, Bennewith 2002, Brown 2005, Carter 2005, Cedereke 2002, Clarke 2002, Crawford 2010, Davidson 2014, Dubois 1999, Evans 1999a, Evans 1999b, Fleischmann 2008, Gibbons 1978, Gratz 2006, Gratz 2014, Grimholt 2015, Guthrie 2001, Gysin-Maillart 2016, Hassanian-Moghaddam 2011, Hatcher 2011, Hatcher 2015, Hatcher 2016, Hawton 1981, Hawton 1987, Harned 2014, Husain 2014, Hvid 2011, Kapur 2013, Kawanishi 2014, Liberman 1981, Lin 2020, Linehan 1991, Linehan 2006, Linehan 2015, Marasinghe 2012, McAuliffe 2014, McMain 2009, McMain 2017, McLeavey 1994, Morgan 1993, Morthorst 2012, Mouaffak 2015, Mousavi 2015, Mousavi 2017, Naidoo 2014, O'Connor 2015, O'Connor 2017, O'Connor 2020, Owens 2020, Patsiokas 1985, Priebe 2012, Sahin 2018, Salkovskis 1990, Slee 2008, Sreedaran 2020, Stewart 2009, Tapolaa 2010, Torhorst 1987, Torhorst 1988, Turner 2000, Tyrer 2003,

Vaiva 2006, Vaiva 2018, Van der Sande 1997, Van Heeringen 1995, Walton 2020, Wang 2016, Waterhouse 1990, Wei 2013, Weinberg 2006, Welu 1977), and 17 studies were from the review investigating pharmacological and psychosocial interventions for children (Asarnow 2017, Cooney 2010, Cotgrove 1995, Cottrell 2018, Donaldson 2005, Green 2011, Griffiths 2019, Harrington 1998, Hazell 2009, McCauley 2018, Mehlum 2014, Ougrin 2011, Rossouw 2012, Santamarina-Pérez 2020, Sinyor 2020, Spirito 2002, Wood 2001a). These reviews were used for recommendation making by the committee, as they were considered sufficiently relevant, high quality and up to date.

The Cochrane reviews are summarised in Table 2, however full details of the Cochrane reviews including methods are available in the review of Psychosocial interventions for self-harm in adults and the review of Interventions for self-harm in children and adolescents.

See the Cochrane reviews for the literature search strategies for the adults review and the CYP review, study selection flow charts for the adults review and the CYP review, forest plots in the adults review and the CYP review and summary of findings tables for the adults review and the CYP review.

Excluded studies

See the lists of excluded studies in the Cochrane adults review and the CYP review with reasons for their exclusions.

Summary of included studies

Summaries of the studies that were included in this review are presented in Table 2.

Table 2: Summary of included studies.

Study	Population	Comparison	Outcomes
Witt 2021a Systematic review	Number of studies: 76 Number of participants: 21414	**Cognitive behavioural therapy (CBT)-based psychotherapy versus TAU or another comparator** 20 RCTs and 1 Zelen RCT, N=3727 adults who have self-harmed (Brown 2005, Davidson 2014, Dubois 1999, Evans 1999b, Gibbons 1978, Guthrie 2001, Hatcher 2011, Hawton 1987, Husain 2014, Lin 2020, McAuliffe 2014, Mousavi 2017, Owens 2020, Patsiokas 1985, Salkovskis 1990, Slee 2008, Stewart 2009, Tapolaa 2010, Tyrer 2003, Wei 2013, Weinberg 2006) **Dialectical behavioural therapy (DBT) versus TAU or another comparator** 10 RCTs, N=873 adults diagnosed with a personality disorder who have self-harmed (Harned 2014, Linehan 1991, Linehan 2006, Linehan 2015, McMain 2009, McMain 2017, Priebe 2012, Sahin 2018, Turner 2000, Walton 2020) **Mentalisation-based therapy (MBT) versus TAU or another comparator** 1 RCT, N=134 adults diagnosed with borderline personality disorder (BPD) who have self-harmed (Bateman 2009)	Primary outcome: • Repetition of SH Secondary outcomes: • Treatment adherence • Depression • Hopelessness • General functioning • Social functioning • Suicidal ideation • Suicide

Study	Population	Comparison	Outcomes
		Emotion-regulation psychotherapy versus TAU or another comparator 2 RCTs, N=83 adults diagnosed with BPD who have self-harmed (Gratz 2006, Gratz 2014) **Psychodynamic psychotherapy versus TAU or another comparator** 2 RCTs, N=241 adults who have self-harmed (Andreoli 2015, Sahin 2018) **Case management versus TAU or another comparator** 5 RCTs, N=2273 adults who have self-harmed (Clarke 2002, Hvid 2011, Kawanishi 2014, Morthorst 2012, Van Heeringen 1995) **Structured general practitioner (GP) follow-up versus TAU or another comparator** 1 RCT, N=202 adults who have self-harmed (Grimholt 2015) **Brief emergency department-based interventions versus TAU or another comparator** 5 RCTs, N=850 adults who have self-harmed (Armitage 2016, Crawford 2010, O'Connor 2015, O'Connor 2017, O'Connor 2020) **Remote contact interventions versus TAU or another comparator** 13 RCTs, 1 Zelen RCT, 1 cross-over RCT and 1 cRCT, N=8731 adults who have self-harmed (Beautrais 2010, Bennewith 2002, Carter 2005, Cedereke 2002, Evans 1999a, Hassanian-Moghaddam 2011, Kapur 2013, Marasinghe 2012, Morgan 1993, Mouaffak 2015, Mousavi 2015, Sreedaran 2020, Vaiva 2006, Vaiva 2018, Wang 2016, Wei 2013) **Provision of information and support versus TAU or another comparator** 3 RCTs, N=2577 adults who have self-harmed (Amadéo 2015, Fleischmann 2008, Naidoo 2014) **Other multimodal interventions versus TAU or another comparator** 3 Zelen RCTs, N=1959 adults who have self-harmed (Gysin-Maillart 2016, Hatcher 2015, Hatcher 2016) **Other mixed interventions versus TAU or another comparator** 9 RCTs, N=1000 adults who have self-harmed (Allard 1992, Hawton 1981, Liberman 1981, McLeavey 1994, Torhorst 1987, Torhorst 1988,	

Study	Population	Comparison	Outcomes
		Van der Sande 1997, Waterhouse 1990, Welu 1977)	
Witt 2021b Systematic review	Number of studies: 17 Number of participants: 2280	**Individual CBT-based psychotherapy (such as CBT, PST) versus TAU or other comparator** 2 RCTs, N=63 CYP who have self-harmed (Donaldson 2005, Sinyor 2020) **Dialectical behavioural therapy (DBT-A) versus TAU or another comparator** 4 RCTs, N=314 adolescents who have self-harmed (Cooney 2010, McCauley 2018, Mehlum 2014, Santamarina-Pérez 2020) **Mentalisation-based therapy (MBT-A) versus TAU or other comparator** 2 RCTs, N=128 CYP who have self-harmed (Griffiths 2019, Rossouw 2012) **Group-based psychotherapy versus TAU or other comparator** 3 RCTs, N=497 CYP who have self-harmed (Green 2011, Hazell 2009, Wood 2001a) **Enhanced assessment approaches versus TAU or other comparator** 1 cRCT, N=70 CYP who have self-harmed (Ougrin 2011) **Compliance enhancement approaches versus TAU or other comparator** 1 RCT, N=76 CYP who have self-harmed (Spirito 2002) **Family interventions versus TAU or other comparator** 3 RCTs, N=1036 CYP who have self-harmed (Asarnow 2017, Cottrell 2018, Harrington 1998) **Remote contact interventions versus TAU or other comparator** 1 RCT, N=105 CYP who have self-harmed (Cotgrove 1995)	Primary outcome: • Repetition of SH Secondary outcomes: • Treatment adherence • Depression • Hopelessness • General functioning • Social functioning • Suicidal ideation • Suicide

cRCT: cluster randomised controlled trial; CYP: children and young people; N: number; PST: problem-solving therapy; RCT: randomised controlled trial; SH: self-harm; TAU: treatment as usual

See the Cochrane adults review and CYP review for characteristics of studies tables.

Summary of the evidence

The Cochrane review of psychosocial interventions for self-harm in adults investigated 12 comparisons, with the following findings:

- Comparison 1: Cognitive behavioural therapy (CBT)-based psychotherapy (e.g. CBT, problem-solving therapy [PST]) versus TAU or another comparator

  - Comparison 1.1: Individual-based CBT-based psychotherapy versus TAU or another comparator. This intervention was more effective for 'repetition of self-harm' at post-intervention (low certainty of the evidence according to GRADE criteria), as well as at 6, 12, and 24-month follow-up, and for 'frequency of self-harm repetition' by the 6 and 12-month assessments. CBT-based psychotherapy had no effect on 'frequency of self-harm repetition' by the post-intervention assessment, nor on 'time to self-harm repetition'.
  - Comparison 1.2: Group-based CBT-based psychotherapy versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' at post-intervention (moderate certainty of the evidence according to GRADE criteria), nor by the 6 or 12-month assessment, and no evidence of effect on 'frequency of self-harm repetition' by the 12-month assessment.
- Comparison 2: Dialectical behaviour therapy (DBT) versus TAU or another comparator
  - Comparison 2.1: Standard DBT versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' at post-intervention (very low certainty of the evidence according to GRADE criteria), nor by the 12-month assessment. DBT was more effective for 'frequency of self-harm repetition' by the post-intervention assessment, but there was no evidence of effect by the 6-month assessment.
  - Comparison 2.2: DBT group-based skills training versus TAU or another comparator. There was no evidence of effect for this intervention only compared to standard DBT for 'suicide reattempts' or 'NSSI' at post-intervention (moderate certainty of the evidence according to GRADE criteria), nor by the 12-month assessment, and no evidence of effect on 'frequency of suicide reattempts' or 'frequency of episodes of NSSI' at the post-intervention or 12-month assessments, nor on 'time to first suicide attempt'.
  - Comparison 2.3: DBT individual therapy versus TAU or another comparator. There was no evidence of effect for this intervention only compared to standard DBT for 'suicide reattempts' or 'NSSI' at post-intervention (moderate certainty of the evidence according to GRADE criteria), nor by the 12-month assessment, and no evidence of effect on 'frequency of suicide reattempts' or 'frequency of episodes of NSSI' at the post-intervention or 12-month assessments, nor on 'time to first suicide attempt'.
  - Comparison 2.4: DBT prolonged exposure protocol versus TAU or another comparator. There was no evidence of effect for this intervention compared to standard DBT for 'repetition of self-harm' at post-intervention (moderate certainty of the evidence according to GRADE criteria), nor by the 6-month assessment, and no evidence of effect on 'frequency of self-harm repetition' at the post-intervention or 6-month assessments.
- Comparison 3: MBT versus TAU or another comparator. This intervention was more effective for 'repetition of self-harm' by the conclusion of the 18-month treatment period (high certainty of the evidence according to GRADE criteria), and for 'frequency of self-harm repetition' by the post-intervention assessment.
- Comparison 4: Emotion-regulation psychotherapy versus TAU or another comparator. This intervention was more effective for 'repetition of self-harm' by the post-intervention assessment (moderate certainty of the evidence according to GRADE criteria), but there was no evidence of effect on 'frequency of self-harm repetition' by the post-intervention assessment.
- Comparison 5: Psychodynamic psychotherapy versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the post-intervention assessment (moderate certainty of the evidence according to GRADE criteria). Psychodynamic psychotherapy was more effective for 'time to repetition of self-harm'.

- Comparison 6: Case management versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the post-intervention assessment (low certainty of the evidence according to GRADE criteria), nor by the 12-month assessment. There were conflicting data about the effectiveness of case management for 'time to self-harm repetition'.
- Comparison 7: Structured GP follow-up versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the post-intervention assessment, either according to hospital records or emergency medical records (low certainty of the evidence according to GRADE criteria).Structured GP follow-up was less effective for 'episodes of self-poisoning' by the post-intervention assessment, but there was no evidence of effect on 'episodes of self-cutting' or 'other methods of self-harm' by the post-intervention assessment.
- Comparison 8: Brief emergency department-based interventions versus TAU or another comparator
    - Comparison 8.1: Brief Collaborative Assessment and Management of Suicidality (CAMS)-based intervention versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the 12-month assessment, nor for 'frequency of self-harm repetition' by the 12-month assessment.
    - Comparison 8.2: Brief guided Integrated Motivational-Volitional-focused intervention versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the 6-month assessment, nor for 'frequency of self-harm repetition' by the 6-month assessment or 'time to self-harm repetition'.
    - Comparison 8.3: Brief self-guided Integrated Motivational-Volitional-focused intervention versus TAU or another comparator. Data on frequency of self-harm could not be disaggregated from data on frequency of suicidal ideation and therefore could not be included in the review.
    - Comparison 8.4: Brief alcohol-focused intervention versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the 6-month assessment.
- Comparison 9: Remote contact interventions versus TAU or another comparator
    - Comparison 9.1: Emergency cards versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the post-intervention assessment (low certainty of the evidence according to GRADE criteria), nor by the 12-month assessment, and no evidence of effect on 'frequency of self-harm repetition' by the 12-month assessment, nor on 'time to self-harm repetition'.
    - Comparison 9.2: Coping cards versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the post-intervention assessment (moderate certainty of the evidence according to GRADE criteria). Coping cards were more effective for 'time to self-harm repetition'.
    - Comparison 9.3: GP letters versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the 12-month assessment, nor for 'time to self-harm repetition'.
    - Comparison 9.4: Postcards versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the post-intervention assessment (very low certainty of the evidence according to GRADE criteria), nor by the 12-month assessment, and no evidence of effect for 'frequency of self-harm repetition' by the post-intervention or 12-month assessments.
    - Comparison 9.5: Telephone contact versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the post-intervention assessment (low certainty of the evidence according to GRADE criteria), nor by the 12 or 24-month assessment, and no

evidence of effect for 'frequency of self-harm repetition' by the post-intervention assessment.
    - Comparison 9.6: Telephone contact combined with emergency cards and letters versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the post-intervention assessment (moderate certainty of the evidence according to GRADE criteria), and no evidence of effect for 'frequency of self-harm repetition' by the post-intervention assessment, nor for 'time to self-harm repetition'.
    - Comparison 9.7: Telephone-based psychotherapy versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the post-intervention assessment (low certainty of the evidence according to GRADE criteria), nor by the 6 and 12-month assessments.
- Comparison 10: Provision of information and support versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the 12-month post-intervention assessment (very low certainty of the evidence according to GRADE criteria). Provision of information and support was less effective for 'frequency of self-harm repetition' by the 6-month assessment.
- Comparison 11: Other multimodal interventions versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the post-intervention assessment (very low certainty of the evidence according to GRADE criteria), nor for 'time to self-harm repetition'. Provision of information and support was more effective for 'frequency of self-harm repetition' at the post-intervention assessment.
- Comparison 12: Other mixed interventions versus TAU or another comparator
    - Comparison 12.1: Continuity of care by the same therapist versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the 12-month assessment.
    - Comparison 12.2: Interpersonal problem-solving therapy versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the 12-month assessment.
    - Comparison 12.3: Behaviour therapy versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the 24-month assessment.
    - Comparison 12.4: Intensive in- and outpatient treatment versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the 12-month assessment, nor on 'frequency of self-harm repetition' or 'time to self-harm repetition'.
    - Comparison 12.5: General hospital management versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the post-intervention assessment (moderate certainty of the evidence according to GRADE criteria), nor by the 4-month assessment.
    - Comparison 12.6: Intensive outpatient treatment versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the 4 or 24-month assessment, nor on 'frequency of self-harm repetition'.
    - Comparison 12.7: Home-based psychotherapy and telephone contact versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the 12-month assessment.
    - Comparison 12.8: Long-term therapy versus TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the post-intervention assessment (low certainty of the evidence according to GRADE criteria).

The Cochrane review of interventions for self-harm in CYP investigated 8 comparisons, with the following findings:

- Comparison 1: Individual CBT-based psychotherapy (for example CBT, PST) compared to TAU or other comparator. There was no evidence of effect for this intervention compared to alternative psychotherapy for 'repetition of self-harm' at post-intervention (low certainty of the evidence according to GRADE criteria).
- Comparison 2: DBT-A compared to TAU or another comparator. This intervention was more effective for 'repetition of self-harm' at post-intervention (high certainty of the evidence according to GRADE criteria), but there was no evidence of effect by the 12-month assessment when compared to alternative psychotherapy, nor for 'frequency of self-harm repetition' by the post-intervention or 12-month assessments.
- Comparison 3: MBT-A compared to TAU or another comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' at post-intervention (very low certainty of the evidence according to GRADE criteria), nor by the 6-month assessment.
- Comparison 4: Group-based psychotherapy versus TAU or other comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the 12 or 24-month assessments.
- Comparison 5: Enhanced assessment approaches versus TAU or other comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the 6 or 12-month assessments.
- Comparison 6: Compliance enhancement approaches versus TAU or other comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' by the 6-month assessment.
- Comparison 7: Family interventions compared to TAU or other comparator. There was no evidence of effect for this intervention for 'repetition of self-harm' at post-intervention (moderate certainty of the evidence according to GRADE criteria), nor by the 18-month assessment, and no evidence of effect for 'time to self-harm repetition' by the post-intervention or 18-month assessments.
- Comparison 8: Remote contact interventions versus TAU or other comparator. There was no evidence of effect for emergency cards for 'repetition of self-harm' by the 12-month assessment.

See the Cochrane adults review and the CYP review for summary of findings tables and full results, including all primary and secondary outcomes and sub-group analyses.

Economic evidence

Included studies

A single economic search was undertaken for all topics included in the scope of this guideline. Nine economic studies were identified which were relevant to this question. Of the studies, 4 evaluated psychosocial interventions for adults (Byford 2003, O'Connor 2017, Owens 2020, and Priebe 2012), and 5 studies evaluated psychosocial interventions for CYP (Byford 1999, Cottrell 2018, Green 2011, Haga 2018, Wijana 2021).

See the literature search strategy in appendix B and economic study selection flow chart in appendix G.

Excluded studies

Economic studies not included in the guideline economic literature review are listed, and reasons for their exclusion are provided in appendix J.

Summary of included economic evidence

The systematic search of the economic literature undertaken for the guideline identified the following studies for adults who have self-harmed:

- One UK study (Byford 2003) on the cost-effectiveness and cost-utility of manual-assisted cognitive behaviour therapy (CBT-MACT) versus TAU alone.
- One UK study (O'Connor 2017) on the cost-effectiveness of a brief psychological intervention (volitional help-sheet) combined with TAU versus TAU alone.
- One UK study (Owens 2020) on the cost-utility of problem solving therapy combined with TAU versus TAU alone.
- One UK study (Priebe 2012) on the cost-effectiveness of dialectical behaviour therapy (DBT) versus TAU.

See the economic evidence tables in appendix H. See Table 3 to Table 6 for the economic evidence profiles of the included studies.

The systematic search of the economic literature undertaken for the guideline identified the following studies for CYP who have self-harmed:

- One UK study (Byford 1999) on the cost-effectiveness of a social work intervention combined with TAU versus TAU alone.
- One UK study (Cottrell 2018) on the cost-utility of family therapy (FT) versus TAU.
- One UK study (Green 2011) on the cost-effectiveness of a manual-based developmental group psychotherapy programme combined with TAU versus TAU alone.
- One study from Norway (Haga 2018) on the cost-effectiveness of DBT for adolescents versus enhanced usual care.

One further study was identified as eligible for the review (Wijana 2021). However, this study was characterised by very serious limitations and it has not been considered in decision making.

See the economic evidence tables in appendix H. See Table 7 to Table 10 for the economic evidence profiles of the included studies.

Economic evidence profiles for adults who have self-harmed

Table 3: Economic evidence profiles for cognitive behaviour therapy in adults who have self-harmed

Author & year Country Interventions	Limitations	Applicability	Economic analysis Time horizon Outcome	Incremental			Uncertainty
				Costs	Effect	Cost effectiveness	
• Guideline economic analysis 2021 • UK • CBT-informed psychological intervention + TAU versus TAU.	Minor[1]	Directly applicable[2]	• Cost-utility analysis • 5 years • QALY	£ 141 (SD 206)	0.016 (SD 0.004)	£ 9,088/QALY	• Using a threshold of £20,000 per QALY gained, CBT-informed psychological intervention had 76% probability of being cost-effective • Alternative scenarios explored in PSA suggest results are robust when model assumptions varied: ○ alternative QALYs valuation ○ length of each CBT session ○ healthcare professional's salaries ○ CBT-informed psychological intervention remained cost effectivee under most scenarios. When it was provided in >10 sessions or when alternative utility data were used in combination with >8 sessions or with a 50% reduction in excess

Author & year Country Interventions	Limitations	Applicability	Economic analysis Time horizon Outcome	Incremental			Uncertainty
				Costs	Effect	Cost effectiveness	
							costs due to self-harm, it was unlikely to be cost effective.
• Byford 2003 • UK • CBT - MACT versus TAU.	Potentially serious[3]	Directly applicable[2]	• Cost-effectiveness and cost-utility analysis • 6 and 12 months • Outcome: ○ Proportion of patients who experienced an episode of SH ○ QALYs	• -£897 at 6 months • -£838 at 12 months (95% CI: -2,212 to 466)	Percent self-harm: • -1% at 6 months • -7% at 12 months QALYs: • Not reported at 6 months • -0.0118 at 12 months	MACT dominant at 6 and 12 months follow-up using SH outcome QALY: • ICER Not reported at 6 months • £66,000/ QALY at 12 months	• Using the self-harm outcome the intervention had >90% probability of being cost effective at WTP of £0-1500 per self-harm episode prevented • Using a threshold of £20,000 per QALY, MACT had 68% probability of being cost-effective at 12 months • The costings performed were robust to the underlying assumptions, such as: ○ including national unit costs instead of local unit costs ○ excluding domestic accommodation costs ○ including costs of court cases

Abbreviations: CBT: Cognitive behaviour therapy; CI: Confidence interval; SD: Standard deviation; MACT: Manual-assisted cognitive behaviour therapy; QALY: Quality-adjusted life-year; SH: self-harm; TAU: Treatment-as-usual; £: British pound sterling
Notes:
1 The findings limited by the lack of self-harm related utility data. On the other hand, the present model was deemed to have important strengths, such long time horizon, effectiveness data from meta-analysis
2 UK analysis, QALYs, NHS and PSS perspective
3 Short time horizon (up to 12 months), the baseline estimates are unlikely to reflect outcomes for people in the UK, as these were based on a single RCT

Table 4: Economic evidence profile for volitional help-sheet in adults who have self-harmed

Author & year Country Interventions	Limitations	Applicability	Economic analysis Time horizon Outcome	Incremental			Uncertainty
				Costs	Effect	Cost effectiveness	
• O'Connor 2017 • UK • VHS + TAU versus TAU.	Minor[1]	Directly applicable[2]	• Cost-effectiveness analysis • 6 months • Re-presentations for SH	-£48	- 0.02	VHS+TAU dominant (less costly and more effective)	• The 95% CI for the incremental costs: -£353 to £257 • There is a 50-60% probability that VHS+TAU (vs TAU) is cost-effective for willingness to pay values ranging from £0 to £100,000 per SH re-presentation avoided • The costings performed were robust to the underlying assumptions on the study population, such as: o considering only those who completed the VHS in hospital. o stratifying according to the presence of SH history.

Abbreviations: CI: Confidence interval; QALY: Quality-adjusted life-year; SH: Self-harm; TAU: Treatment-as-usual; VHS: Volitional help-sheet; £: British pound sterling
Notes:
1 Short time horizon (6 months), however, it was deemed to meet most quality criteria
2 UK study, NHS and PSS perspective, no QALYs, however it did not matter as the intervention was dominant

Table 5: Economic evidence profile for problem solving therapy in adults who have self-harmed

Author & year Country Interventions	Limitations	Applicability	Economic analysis Time horizon Outcome	Incremental			Uncertainty
				Costs	Effect	Cost effectiveness	
• Owens 2020 • UK • PST + TAU versus TAU.	Potentially serious[1]	Directly applicable[2]	• Cost-utility analysis • 3 and 6 months • QALYs	• £ -2,074 • £ -1,425	• 0.014 • 0.020	PST+TAU dominant (it is less costly and more effective)	• Statistical analysis was undertaken, with results found to be significant • Conclusions unchanged when intervention cost excluded booster session

Abbreviations: PST: Problem solving therapy; QALY: Quality-adjusted life-year; TAU: Treatment-as-usual; £: British pound sterling
Notes:
1 Based on small RCT (N=62), short time horizon (up to 6 months)
2 UK study, QALYs, NHS and PSS perspective

Table 6: Economic evidence profile for dialectical behaviour therapy for adults who have self-harmed

Author & year Country Interventions	Limitations	Applicability	Economic analysis Time horizon Outcome	Incremental			Uncertainty
				Costs	Effect	Cost effectiveness	
• Priebe 2012 • UK • DBT versus TAU.	Potentially serious[1]	Partially applicable[2]	• Cost-effectiveness analysis • 12 months • Re-presentations for SH	£ 3,029 (95% CI 476 to 5,583)	0.09 (95% CI 0.08 to 0.11)	£ 36 per 1% reduction in the incidence of SH	• The sensitivity analysis with last observation carried forward showed a very similar result to the base-case analysis

Abbreviations: CI: Confidence interval; DBT: Dialectical behaviour therapy; QALY: Quality-adjusted life-year; SH: self-harm; TAU: Treatment-as-usual; £: British pound sterling
Notes:
1 Short time horizon (12 months); the baseline estimates are unlikely to reflect outcomes for the relevant group of people in the UK, as were based on a single RCT
2 Population were people with borderline personality disorder who have self-harmed, no QALYs, societal perspective

Economic evidence profiles for children and young people who have self-harmed

Table 7: Economic evidence profile for social work intervention in children and young people who have self-harmed

Author & year Country Interventions	Limitations	Applicability	Economic analysis Time horizon Outcome	Incremental			Uncertainty
				Costs	Effect	Cost effectiveness	
• Byford 1999 • UK • SWI + TAU versus TAU.	Potentially serious[1]	Directly applicable[2]	• Cost-effectiveness analysis • 6 months • Outcomes: ○ Suicidal Ideation ○ Hopelessness scale ○ Family Assessment Device	-£ 296	No data reported, however no difference in effect	SWI+TAU cost saving	• No statistically significant differences between groups in costs or any outcomes • In the subgroup of children and adolescents without a diagnosis of major depression the SWI was likely to be cost-effective • Changing most assumptions on cost estimation did not influence the results, such as: ○ varying professional staff overhead costs ○ varying unit cost of therapist delivering the intervention ○ varying hospital costs ○ including costs associated with those who failed to attend treatement

Abbreviations: SWI: Social work intervention; TAU: Treatment-as-usual; £: British pound sterling
Notes:
1 Short time horizon (6 months), the baseline estimates are unlikely to reflect outcomes for the relevant group of people in the UK, as were based on a single RCT
2 UK study, NHS and PSS perspective, no QALYs, however no significant difference in any outcomes

Table 8: Economic evidence profile for family therapy in children and young people who have self-harmed

Author & year Country Interventions	Limitations	Applicability	Economic analysis Time horizon Outcome	Incremental			Uncertainty
				Costs	Effect	Cost effectiveness	
• Cottrell 2018 • UK • FT versus TAU.	Minor[1]	Directly applicable[2]	• Cost-utility analysis • Time horizon[3]: ○ 18 months ○ 5 years • QALYs	• £1,266 at 18 months • £1,262 at 5 years	• 0.034 QALYs at 18 months • 0.065 QALYs at 5 years	• £36,812/QALY at 18 months • £19,488/QALY at 5 years	• Using cost per QALY threshold of £20,000, FT had a 12% chance of being cost-effective at 18 months • Using cost per QALY threshold of £20,000, FT had a 50% chance of being cost-effective at 5 years • The findings of the primary analyses were robust to the underlying assumptions, including: ○ varying number of therapists involved in each treatment session in the FT arm ○ accounting for EQ-5D differences between arms at baseline ○ including only those participants with no missing quality-of-life and cost data ○ using an aggregate QALY, that is, taking into consideration both the young people's and caregivers' QALY gains.

Abbreviations: FT: Family therapy; QALY: Quality-adjusted life-year; TAU: Treatment-as-usual;
Notes:
1 Baseline effectiveness data from a single RCT, otherwise the study was deemed to meet other quality criteria
2 UK study, QALYs, NHS and PSS perspective
3 Primary analysis - Trial based economic evaluation, 18-months' time horizon; Secondary analysis - Model based economic evaluation, 5-years' time horizon

Table 9: Economic evidence profile for manual-based developmental group psychotherapy programmes in children and young people who have self-harmed

Author & year Country Interventions	Limitations	Applicability	Economic analysis Time horizon Outcome	Incremental			Uncertainty
				Costs	Effect	Cost effectiveness	
• Green 2011 • UK • Manual-based developmental group psychotherapy programme + TAU versus TAU.	Minor[1]	Partially applicable[2]	• Cost-effectiveness analysis • 12 months • Frequency of SH episodes	£6,383 (95% CI −13,732 to 965)	3% [3]	£2,020 per 1% increase in the proportion of young people not self-harming.	• The probability of group therapy being cost-effective ranges from 12% to 28% as willingness to pay (WTP) for outcome improvement increases. It is unclear what the actual WTP values were. • The results were largely unchanged when including parental travel/productivity losses, and using multiple imputation for missing data.

Abbreviations: SH: Self-harm; TAU: Treatment-as-usual; £: British pound sterling
Notes:
1 Short time horizon (12 months), this study was deemed to meet most other quality criteria
2 UK study, NHS and PSS perspective, no QALYs estimated
3 Data on uncertainty around point estimate no reported

Table 10: Economic evidence profiles for dialectical behaviour therapy in children and young people who have self-harmed

Author & year Country Interventions	Limitations	Applicability	Economic analysis Time horizon Outcome	Incremental			Uncertainty
				Costs	Effect	Cost effectiveness	
• Guideline economic analysis 2021 • UK • DBT-A versus enhanced TAU	Minor[1]	Directly applicable[2]	• Cost-utility analysis • 5 years • QALYs	£1,794 (SD 617)	0.007 (SD 0.003)	£ 268,601/QALY	• Using a threshold of £20,000 per QALY gained, DBT-A had 0% probability of being cost-effective • Deterministic sensitivity analyses suggest that DBT-A becomes cost-effective if:

Author & year Country Interventions	Limitations	Applicability	Economic analysis Time horizon Outcome	Incremental			Uncertainty
				Costs	Effect	Cost effectiveness	
							○ the baseline risk of RSH is at least 69% (in the base-case analysis this value was 14% under enhanced TAU, and 26% in the Markov model component); ○ the delivery cost of DBT-A is at maximum £1,135 (instead of £2,801 in the base-case scenario); ○ the healthcare cost incurred by children and young people following an episode of RSH is at least £55,000 (in base-case analysis this value was £1,859)
• Haga 2018 • Norway • DBT-A versus EUC.	Potentially serious[3]	Partially applicable[4]	• Cost-effectiveness analysis • 71 weeks • Outcomes ○ (1) Number of SH episodes ○ (2) Change in CGAS score (global functioning)	-€ 7,805 (p=0.508)	• (1): -22.5 (95% CI −40.6 to −4.3) • (2): 4.1 (95% CI −2.3 to 10.6)	DBT-A dominant using both outcomes (it is less costly and more effective)	• Mean number of self-harm episodes: ○ the probability of DBT-A being cost-effective (vs EUC): 97.5-99.5% at a willingness-to-pay (WTP) value of €400-1,400. ○ DTB-A dominant (vs EUC) in 89.7% of the simulated ICERs using self-harm outcome (DBT-A is more effective and less costly) • Mean change in CGAS scores ○ the probability of DBT-A being cost-effective (vs EUC): 94.9% at a WTP of

Author & year Country Interventions	Limitations	Applicability	Economic analysis Time horizon Outcome	Incremental			Uncertainty
				Costs	Effect	Cost effectiveness	
							€1,600 per point improvement on CGAS scale ○ DBT-A dominant (vs EUC) in 78.7% of the simulated ICERs using CGAS outcome (DBT-A is more effective and less costly) • When considering only outpatient costs the DBT-A is likely to be more costly than EUC

Abbreviations: DBT-A: Dialectical behaviour therapy for Adolescent; CEP: Cost effectiveness plane; CGAS: Children's Global Assessment Scale; CI: Confidence interval; DBT: Dialectical behaviour therapy; EUC: Enhanced usual care; QALY: Quality-adjusted life-year; RSH: repeat self-harm; SH: Self-harm; SD: Standard deviation; TAU: Treatment-as-usual; €: Euro; £: British pound sterling
Notes:
1 The findings of the model may be restricted by the paucity of self-harm related utility data. On the other hand, the present model was deemed to have important strengths, such the long-term time horizon; and its effectiveness data based on meta-analysis
2 UK study, QALYs, NHS and PSS perspective
3 Short time horizon (71 weeks), some local unit cost data, baseline data from a single RCT
4 The study was conducted in Norway and included a large proportion of adolescents with borderline personality disorder (21%, 15/77) who have self-harmed, narrow healthcare perspective

Economic model

Two cost-utility analyses were developed to assist the committee decision making in this area of the guideline, as the available economic evidence assessed a limited number of interventions, was often inconclusive or not applicable to the NICE decision-making context. Moreover, existing economic evidence was based on single studies, whereas the guideline was informed by systematic reviews and meta-analyses of RCTs of psychological and psychosocial therapies for children and adults who have self-harmed. One economic analysis aimed to evaluate the relative cost-effectiveness of CBT-informed psychological intervention in addition to TAU versus TAU alone for adults who self-harm; the other economic analysis aimed to evaluate the cost-effectiveness of DBT-A relative to enhanced TAU for children who self-harm. Both interventions were shown to be effective following meta-analyses of RCTs (Witt 2021a, Witt 2021b). This section provides a summary of the methods employed and the results of the economic analyses. See appendix I for full details.

Each economic analysis utilised a hybrid model, comprising a 6-month decision-tree, followed by a 3-state Markov model (repeat self-harm - RSH, noRSH and death) that lasted 4.5 years. The time horizon of each model was 5 years. This period was considered to be long enough to capture longer-term costs and effects of treatment, without significant extrapolation over the course of RSH. Both analyses adopted the perspective of the NHS and personal social services (PSS), and used the QALY as the measure of outcome. For both analyses, costs consisted of intervention costs and costs of health and social care services incurred by adults or children who have self-harmed, as relevant. The cost year was 2020.

Efficacy data were obtained from the two Cochrane reviews and meta-analyses that informed this area of the guideline (Witt 2021a, Witt 2021b). Other clinical data were obtained from cohort studies or RCTs conducted in the UK. Utility data were based on published evidence. Resource use data relating to the delivery of the interventions were based on the trials included in the meta-analyses that informed the guideline economic models, supplemented by the committee's expert advice, so that resource use reflects optimal routine practice in the UK. Other health and social care costs incurred by people who have self-harmed were taken from cohort studies or RCTs conducted in the UK. National unit costs were used. Model input parameters were synthesised in a probabilistic analysis. This approach allowed more comprehensive consideration of the uncertainty characterising the input parameters and captured the non-linearity characterising the economic model structure. A number of deterministic sensitivity analyses were also carried out. Results were expressed in the form of incremental cost-effectiveness ratios (ICERs).

According to the base-case results of the cost-utility analysis concerning CBT-informed psychological intervention for adults who self-harm, the ICER of CBT-based psychotherapy added to TAU versus TAU was £9,088/QALY, which is below the lower NICE threshold of £20,000 per QALY. Alternative scenarios tested included increased intensity in the delivery of the CBT-based psychotherapy, different unit costs of health professionals delivering the intervention, alternative utility data, changes in the health and social care costs incurred by adults who self-harm, and changes in the baseline risk of RSH. Delivery of the CBT-informed psychological intervention remained likely to be cost effective in adults who self-harm in most scenarios tested, suggesting confidence in the model's results.

According to the base-case results of the economic model on the cost-effectiveness of DBT-A versus enhanced TAU for children and young people at risk of RSH, the ICER for DBT-A versus enhanced TAU was £268,601/QALY, which is well above the lower NICE threshold of £20,000 per QALY; therefore, DBT-A is not a cost-effective psychological therapy compared to the enhanced TAU. A number of alternative scenarios were explored, such as a different delivery mode of DBT-A, different unit costs of health professionals delivering the intervention, changes in utility data, as well as changes in the baseline risks of RSH or

intervention cost of DBT-A or health and social care costs incurred by children and young people at risk of RSH that would be required in order for the intervention to become cost-effective. Delivery of DBT-A remained unlikely to be cost effective in children and young people who are at risk of RHS under most plausible scenarios, suggesting confidence around models' results when model assumptions varied. The only plausible (although highly unlikely in the general population of children and young people at risk of RSH) change in input parameters that would make DBT-A cost-effective was when the baseline risk of self-harm repetition was at least 69%, which would be reflecting the healthcare circumstances and needs of a particular sub-group of CYP who RSH, such as those CYP at very high risk of self-harm recurrence over time, such as CYP with significant emotional dysregulations who have frequent episodes of self-harm.

Evidence statements

Economic

Psychological and psychosocial interventions for adults who have self-harmed

- Evidence from the guideline cost-utility analysis suggests that CBT-informed psychological intervention for adults who have self-harmed is likely to be cost-effective when added to TAU *versus* TAU alone from a UK NHS and personal social services perspective. The economic analysis is directly applicable to the NICE decision-making context and is characterised by minor limitations.
- Evidence from a cost-utility analysis conducted alongside a RCT (Byford 2003, N=397) suggests that a manual-assisted cognitive behaviour therapy (MACT) is likely to be cost-effective compared with TAU in adults who have self-harmed in the UK. The study is directly applicable to the UK but has potentially serious limitations.
- Evidence from a cost-effectiveness analysis conducted alongside a RCT (O'Connor 2017, N=518) suggests that brief psychological intervention (a volitional help-sheet) combined with TAU is likely to be cost-effective compared with TAU alone in adults who have self-harmed in the UK, as it was found to be more effective and less costly than TAU alone at 6 months follow-up. The study is directly applicable to the UK and has minor limitations.
- Evidence from a cost-utility analysis conducted alongside a RCT (Owens 2020, N=62) suggests that cognitive behaviour based-psychotherapy (problem-solving therapy) added onto TAU is likely to be cost-effective compared with TAU alone in adults who have self-harmed in the UK, as it was found to be more effective and less costly than TAU alone. The study is directly applicable to the UK but has potentially serious limitations.
- Evidence from a cost-effectiveness analysis conducted alongside a RCT (Priebe 2012, N=80) was inconclusive regarding the cost-effectiveness of dialectical behaviour therapy (DBT) compared with TAU in adults with borderline personality disorder who have self-harmed in the UK. This is because DBT was found to be more effective and more costly than TAU, but no QALYs were estimated and therefore a judgement needs to be made on whether the extra benefit is worth the extra cost. The study is partially applicable to the NICE decision-making context and is characterised by potentially serious limitations.

Psychological and psychosocial interventions for CYP who have self-harmed

- Evidence from a cost-effectiveness analysis conducted alongside a RCT (Byford 1999, N=162) suggests that a home-based social work intervention may be potentially cost-effective compared with TAU in CYP who have self-harmed in the UK, as no statistically significant differences in costs or outcomes were found between the two interventions, however, costs were slightly lower for the intervention compared with TAU. The study is directly applicable to the NICE decision-making context but is characterised by potentially serious limitations.

- Evidence from a cost-utility analysis conducted alongside a RCT (Cottrell 2018, N=832) suggests that family therapy is unlikely to be cost-effective compared with enhanced TAU in CYP referred to CAMHS (children and adolescent mental health services) after self-harm in the UK over 18 months, but may become cost-effective over 5 years. The study is directly applicable to the UK and is characterised by minor limitations.
- Evidence from a cost-effectiveness analysis conducted alongside a RCT (Green 2011, N=364) is inconclusive regarding the cost-effectiveness of a manual-based developmental group psychotherapy programme combined with TAU *versus* TAU alone in CYP referred to CAMHS (children and adolescent mental health services) after self-harm in the UK. This is because the intervention was found to be more effective and more costly than TAU, but no QALYs were estimated and therefore a judgement needs to be made on whether the extra benefit is worth the extra cost. The study is partially applicable to the NICE decision-making context because, although it was conducted in the UK, no QALYs were estimated, and is characterised by minor limitations.
- Evidence from the guideline cost-utility analysis suggests that dialectical behavioural therapy (DBT-A) for CYP who have self-harmed is not cost-effective from a NHS and personal social services perspective, compared to enhanced TAU. The economic analysis is directly applicable to the UK and is characterised by minor limitations.
- Evidence from a cost-effectiveness analysis carried out alongside a RCT (Haga 2018, N=77) from Norway suggests that dialectical behaviour therapy for adolescents (DBT-A) is cost-effective compared with enhanced TAU in CYP who self-harmed, mostly people with borderline personality disorder, in Norway, as it is more effective and less costly than enhanced TAU. The study is partially applicable to the UK and is characterised by potentially serious limitations.

The committee's discussion and interpretation of the evidence

The outcomes that matter most

The Cochrane protocols' primary outcome was occurrence of repeated self-harm within a maximum follow-up period of 2 years, which the committee agreed is critical as it is a direct measure of any differential effectiveness associated with the psychosocial intervention. All other outcomes listed in the Cochrane protocol (treatment adherence; depression; hopelessness; general functioning; social functioning; suicidal ideation; suicide) were agreed to be important outcomes by the committee. The committee agreed that treatment adherence would indicate the patient's satisfaction with the intervention and ultimately determine its success. Depression, hopelessness, and suicidal ideation were agreed to be important outcomes as they are measures of well-being which may capture long-term health-related outcomes associated with the effectiveness of interventions. The committee agreed that general functioning and social functioning were also important as measures of how successful the intervention is at reducing the impact of self-harm on the person's day-to-day life and ability to build and maintain relationships. Suicide was also agreed by the committee to be a direct measure of any differential effectiveness associated with the pharmacological intervention.

The quality of the evidence

When Cochrane assessed the evidence using GRADE methodology it was found to range from high to very low quality, with most of the evidence being moderate or low quality. Where evidence was downgraded it was mainly due to imprecision of the effect size (where the 95% confidence intervals for the pooled effect included the null value), risk of bias as per Cochrane RoB 2.0 (due to bias in the randomisation process, deviations from the intended interventions, missing outcome data, measurement of the outcome, and/ or selection of the reported results), and in some cases, significant heterogeneity between studies as indicated by the I^2 value. In 1 case, evidence was downgraded due to suspicion of publication bias.

The committee discussed the evidence presented by Cochrane which showed that although the evidence base remained somewhat uncertain regarding the effectiveness of most psychological and psychosocial interventions with regards to self-harm repetition in both adults and CYP, there was limited emerging evidence of low and high quality respectively which showed individual cognitive behavioural therapy (CBT) and dialectic behavioural therapy for adolescents (DBT-A) had positive effects on repetition of self-harm in their respective cohorts.

There was evidence about the effectiveness of a number of longer term and brief psychological interventions but it was unclear whether they were effective for key populations (such as men or people who repeatedly self-harm). The committee made a research recommendation on the effectiveness of psychological interventions in these populations.

Benefits and harms

The committee agreed, based on their knowledge and experience, that all treatment should be planned according to the psychosocial assessment, as assessment can indicate the suitability of potential treatments. The committee also discussed the fact that self-harm is often associated with coexisting conditions such as depression or anxiety, and agreed that planning treatment for self-harm in isolation of these other factors could lead to an inappropriate care pathway, or a lowered chance of recovery. The committee discussed the various coexisting conditions that are frequently associated with self-harm, and agreed there were a number of NICE guidelines that clinicians should be aware of, so they can understand when a patient may have coexisting conditions and how these might interact with self-harm. This would allow clinicians to appropriately plan treatment for patients according to their overall needs and not any one factor in isolation, prioritising any coexisting conditions to ensure the most appropriate intervention is provided for the individual and to promote person-centred care.

The committee agreed that overall, the evidence showed a beneficial effect of psychological and psychosocial therapies on various outcomes and therefore psychological or psychosocial therapy generally should be recommended for children and adults who have self-harmed. In particular, for adults there was evidence from 20 trials that showed psychological interventions informed by CBT had positive effects on repetition of self-harm at longer follow-up assessments, as well as small beneficial effects on depression, hopelessness, and suicidal ideation over time. However, the committee acknowledged that the evidence from the Cochrane review was flawed due to the wide interpretation of 'CBT-based psychotherapies' which included therapeutic elements not necessarily typical to CBT, such as problem-solving therapy. The categorisation of all interventions throughout the evidence review was indistinct with some of the comparisons including therapies which overlapped across different interventions. However, the evidence did show a potential benefit of psychological interventions which were structured, person-centred, time-limited, and informed by cognitive behavioural therapy. The recommendation that a CBT-informed psychological intervention should be offered to people who self-harm was therefore based on the evidence that this had a positive effect on reducing repeat self-harm at long-term follow-up. The committee agreed other treatment modalities might be effective in adults who have self-harmed as long as they meet these principles. The committee discussed the evidence from the qualitative review on involving families and carers in management of self-harm (Evidence Report D) which showed that long waiting times for treatment was often a barrier to help-seeking, and agreed based on this evidence as well as their own experience that treatment should be offered as soon as possible to people who had self-harmed. The committee discussed whether the specific period of within 72 hours of assessment should be recommended, but ultimately agreed that without specific evidence, and based on their knowledge that it can be unfeasible to start longer term treatment within that timeframe, the timeframe should be nonspecific. However, the committee still wanted to acknowledge the potential negative effects of delaying treatment on repeat self-harm and suicide based on their knowledge and experience, and therefore agreed on the recommendation that

treatment should start without delay. The recommendation regarding the number of sessions was based on the committee's discussion of the cost-effectiveness evidence, as outlined below, however the committee agreed it was important to highlight the fact that some people may need more than 10 sessions, to ensure people receive the person-centred care they need and to enhance their experience of services. Additionally, any psychological or psychosocial interventions should be tailored to the individual's needs and preferences, based on the committee's knowledge and experience that enabling service users to make informed decisions about and have input on their own care has a beneficial effect on the person's satisfaction and likelihood to engage with services.

There were limited data from 1 trial which showed mentalisation-based therapy (MBT) had positive effects on absolute repetition of self-harm and frequency of self-harm at post-intervention, while data from 2 trials showed emotion-regulation psychotherapy in a group setting also had positive effects on absolute repetition of self-harm at post-intervention specifically for women diagnosed with borderline personality disorder. The evidence of effects for standard dialectical behaviour therapy (DBT) on frequency of self-harm repetition in adults was uncertain. Finally, there was no evidence of an effect of self-harm repetition for remote contact interventions, case management, information and support, and other multimodal interventions. The committee agreed that the evidence allowed them to make recommendations for CBT-informed psychological interventions, however on the basis of such an uncertain evidence base for MBT, emotion-regulation psychotherapy and DBT, the committee could not make specific recommendations for these interventions for adults.

For children and young people, there was high-certainty evidence from 4 trials that DBT-A had a positive effect on repetition of self-harm in adolescents at post-intervention but an uncertain evidence base for other therapies: Cochrane reported low-certainty evidence regarding whether CBT had a positive effect on repetition of self-harm at post-intervention; very low-certainty evidence regarding whether MBT-A had a positive effect on repetition of self-harm at post-intervention; no evidence of effect on repetition of self-harm at post-intervention for family therapy; no evidence of effect on repetition of self-harm for compliance enhancement approaches, group-based psychotherapy, a remote contact intervention (emergency cards), or for therapeutic assessment. The committee agreed that the evidence for DBT-A allowed them to make recommendations for this therapy, however the committee could not make specific recommendations for any other therapies on the basis of such an uncertain evidence base. Therefore, the recommendation to consider offering DBT-A to children and young people was based on the evidence showing DBT-A has a positive effect on reduced repetition of self-harm in adolescents. However, the committee agreed they could not make a strong recommendation because the evidence was limited by the fact that participants in studies which showed this effect had all self-harmed more than once, were all between the ages of 12 and 18 years and were mostly female, and there was no evidence of effect of DBT-A on repeat self-harm by 12-month follow-up. The committee discussed whether the evidence could be extrapolated to children under the age of 12 and agreed, based on their knowledge and expertise, that DBT-A was likely to be similarly effective in children due to the fact that DBT-A would be carried out by very specialised staff members for children under the age of 12. The committee agreed that the lack of evidence of for children under 12 years was likely to be more reflective of the small trial sizes and nature of the sample rather than representative of the effect of DBT-A on this age group. Additionally, there was no evidence showing potential harms of DBT-A for adolescents, and the committee agreed offering DBT-A to children under 12 carried similarly low risk of harm. On the other hand, the committee agreed that not providing a therapeutic intervention to children under the age of 12 could allow for self-harm to become a coping mechanism, or otherwise repeated behaviour in the patient. They therefore agreed that DBT-A should be recommended for both children and young people despite the lack of evidence for children, to reduce the rates of repeat self-harm and suicide in this age group. However, the committee agreed they could not be sure that DBT-A would be similarly effective for children and young people who did not frequently self-harm, so they could not extrapolate the

evidence any further to other populations. The recommendation was also based on the committee's discussion of the cost-effectiveness evidence, as outlined below, however there was insufficient evidence for the committee to define how frequent self-harm would have to be to determine whether the person should receive DBT-A. The committee also agreed they could not further define how DBT-A should be provided as per the recommendation for CBT, due to the lack of robustness in the evidence base.

The committee acknowledged the weak evidence base meant that interventions other than CBT-informed psychological interventions for adults or DBT-A for children and young people might be appropriate depending on the results of the person's psychosocial assessment. They agreed the recommendation to plan treatment according to the person's assessment and any coexisting comorbidities would ensure this was taken into consideration to ensure the person received the right intervention for them.

The committee agreed that any therapy offered should be delivered by staff with training in the relevant therapy and who are receiving appropriate supervision, to ensure the competence of the professional delivering the training allows for the needs of the person to be met and for the treatment to be tailored for people who self-harm. The committee agreed further limitations on which staff could deliver therapies were unnecessary and could result in implementation difficulties and delays in treatment provision.

The committee agreed that any intervention should be delivered in a collaborative way with the individual and should focus on the positive effects of therapies, based on their knowledge that a strength-based approach would have the effect of finding solutions rather than focusing on potential problems for the person.

Although safety planning was not analysed as a standalone intervention in the Cochrane psychological interventions review, the committee agreed that safety planning is an important aspect of care for people who have self-harmed that is already commonly used in current practice as an adjunct to another intervention such as CBT, based on their experience and expertise. The committee's understanding of the importance of safety plans is supported by the qualitative evidence in the review for specialist staff skills (see Evidence Report P), in which specialist staff identified safety planning as a technique that can help people manage self-harm. The committee discussed the benefits of safety planning, which they agreed equipped people who had self-harmed with the ability to identify and use their strengths and sources of support to overcome crisis moments and prevent the thought, temptation, and accessibility of self-harm. The committee discussed whether to make a strong recommendation despite the low quality of the available evidence as assessed with GRADE CERQual, because safety planning is increasingly offered to people who have self-harmed as a part of existing practice. However, the committee agreed that a stronger recommendation for safety planning would overprivilege the evidence and imply the existence of strong data where they currently do not exist. Evidence about the benefits and harms of safety planning would be necessary to confidently make a strong recommendation. The committee agreed based on their knowledge and expertise that one of the most important aspects of safety planning was reducing lethal means access, because access to means is consistently recognised as a risk factor in suicide research. The committee thought that this should always be done in collaboration with the person to protect the individual's autonomy and dignity in moments of crisis, which could increase service user satisfaction and lower distress. Three studies included in the Cochrane review explicitly used safety planning as a part of the intervention (Armitage 2016b; Gysin-Maillart 2016; Lin 2020); the committee considered the components of these safety-planning interventions and discussed their merits. The plans in these studies included identifying the following: long-term goals; potential crisis situations; individual warning signs; personal safety strategies (such as reinforcing positive thinking, rewarding not self-harming, seeking out social support, taking medication). The committee agreed it was important for people who had self-harmed to be able to recognise warning signs so they could proactively put their safety plan into action and prevent a potential crisis that could lead to self-harm. In order to prevent self-harm upon

recognising warning signs, the committee agreed it was important for professionals to help people who have self-harmed develop coping strategies to minimise distress and lower the rates of self-harm, however the committee agreed these coping strategies should be individualised to ensure generic advice which might not be helpful for the individual is not given. The committee also agreed that consideration should be given to any potential barriers to enacting these strategies, as well as problem-solving to ensure the person is equipped to deal with these barriers as they come up. Qualitative evidence from both staff skills reviews showed that people who had self-harmed, as well as specialist and non-specialist staff, identified the ability to help patients develop coping strategies as an important skill for professionals to have. The quality of this evidence was low in the specialist review but moderate in the non-specialist review. The committee also discussed the benefits of helping people to identify social contacts and settings they could seek out in a crisis, because they agreed distraction was a useful technique that could lower the distress of the person and reduce the urge to self-harm in the moment, based on their experience. The qualitative review on support needs of people who had self-harmed (see Evidence Report A) found moderate quality evidence that people who had self-harmed identified family members and friends as important sources of emotional and/or practical support. The committee therefore recommended such contacts be identified as part of a safety plan because this support could be invaluable during a crisis to prevent self-harm. The committee discussed the fact that participants in the Gysin-Maillart study were given crisis cards with contact details for private and professional helpers who could be contacted in case of a crisis, and agreed that safety plans should include contact details for these services so the person can access spontaneous support and care in a crisis. In particular, the committee agreed that out-of-hours services were important based on their knowledge that often people need help in the evenings or at night when some services may not be accessible, rendering them useless to people who need them. Furthermore, the committee agreed that there were situations where a person might need to talk to services without it being an emergency, and added that these services should available to people regardless of their levels of distress/ state of emergency. They agreed this would help prevent self-harm proactively rather than waiting until the person was in crisis.

The process of safety planning was seen as a therapeutic element in itself by the committee as their experience showed it had the benefits of allowing the person to feel listened to, understood, and validated. All three studies in the Cochrane review that explicitly used safety planning as a part of the intervention implemented collaborative decision-making with the person, which the committee agreed would improve the patient's engagement with services based on their knowledge and expertise. The committee discussed how the safety plan should be provided to the person and agreed that the person should have a copy of the plan to hold, as this would emphasise the collaborative aspect of the safety plan and allow it to be more accessible to the person in a crisis. If the safety plan is not accessible, the committee agreed based on their knowledge and expertise that this would reduce its efficacy, especially if the person was too distressed to remember their plan. This could defeat the purpose of the safety plan and lead to repeat self-harm. The committee also discussed the importance of social connectedness as a protective factor against self-harm based on their expertise, and agreed that care plans should therefore be shared with family members/ carers and other professionals when appropriate.

The committee discussed their concern that the avoidance of offering appropriate psychological or psychosocial interventions based on availability or resource implication could have a significant harmful effect on the people who had self-harmed for whom these therapies should normally be offered. They also discussed the fact that some people do not receive appropriate interventions in current practice based on their demographic or certain comorbidities such as a diagnosis of borderline personality disorder. The committee agreed that such interventions should always be available to all people who have self-harmed, based on their expertise that this can reduce the likelihood of services not being offered to people who need them, in turn potentially reducing the rates of repeat self-harm or suicide.

Cost effectiveness and resource use

The committee noted that 9 relevant papers had been identified in the literature review of published economic evidence on this topic (Byford 1999, Byford 2003, Cottrell 2018, Green 2011, Haga 2018, O'Connor 2017, Owens 2020, Priebe 2012, Wijana 2021); of these, Wijana 2021 was characterised by very serious limitations and was not considered further when formulating recommendations. Moreover, 2 bespoke economic analyses were undertaken for this area of the guideline.

One guideline economic analysis aimed to evaluate the relative cost-effectiveness of CBT-informed psychological intervention in addition to treatment as usual (TAU) versus TAU alone for adults who self-harm; the other guideline economic analysis aimed to evaluate the cost-effectiveness of DBT-A relative to enhanced TAU for children and young people (CYP) who self-harm. Both economic models were cost-utility analyses (CUA) that adopted the perspective of the NHS and personal social services (PSS). The committee agreed that both economic analyses are directly applicable to the NICE decision-making context and are characterised by minor limitations.

Of the 8 economic studies identified with the review of economic evidence and considered by the committee, 4 evaluated psychological and psychosocial interventions for adults (Byford 2003, O'Connor 2017, Owens 2020, and Priebe 2012), and 4 studies evaluated psychological and psychosocial interventions for CYP (Byford 1999, Cottrell 2018, Green 2011, and Haga 2018). The committee considered this economic evidence to be directly relevant to the guideline's decision-making, with the exception of three studies (Green 2011, Haga 2018, and Priebe 2012), because they either were conducted outside the UK, or they did not use the QALY as the measure of outcome and therefore assessment of the cost-effectiveness of interventions was not straightforward. Most studies included in the review were cost-effectiveness analyses (Byford 1999, Green 2011, Haga 2018, O'Connor 2017, Priebe 2012), or CUAs (Byford 2003, Cottrell 2018, and Owens 2020). All economic evaluations included were undertaken alongside clinical trials, however, most of the studies did adopt a relatively long-term time frame to reflect the long-term costs and benefits of psychological and psychosocial interventions for people who self-harmed; the time horizon in 5 studies was > 1 year (Byford 2003, Cottrell 2018, Green 2011, Haga 2018, and Priebe 2012), whereas only three studies used a time horizon shorter than 1 year (Byford 1999, O'Connor 2017, and Owens 2020). Some of the studies were characterised by potentially serious methodological limitations (Byford 1999, Byford 2003, Haga 2018, Priebe 2012, Owens 2020).

Based on the findings of the Cochrane systematic reviews on interventions for adults and CYP who self-harmed, the committee considered CBT-informed psychological intervention for adults and DBT-A for CYP as potential candidates for recommendation, as these were the only interventions with adequate evidence suggesting these are effective. Hence, these interventions were prioritised for economic modelling.

The committee agreed that overall, according to the findings of the economic analysis, the CBT-informed psychological intervention is likely to be cost-effective in the treatment of adults who self-harm. The committee noted that the results of the economic analysis indicated that a CBT-informed psychological intervention was cost-effective if it was delivered in up to 10 sessions, after examining a number of alternative scenarios in sensitivity analysis. However, use of alternative utility data (that suggested narrower gains in utility following a reduction in self-harming behaviour) in combination with 8-10 sessions or with a lower excess NHS cost for people who repeat self-harm within 6 months relative to those who don't resulted in the intervention becoming not cost-effective. Nevertheless, the committee expressed the view that these analyses reflected relatively extreme scenarios regarding the data used, where a narrow range of utility values was combined with either a large number of psychological therapy sessions or with a NHS excess cost that was likely lower that the usual cost incurred by people who self-harm.

Based on the findings of the economic model and supplemented by the results of the clinical review, the committee pointed out the potential vital role of CBT-informed psychological intervention in the management of self-harm recurrence in adults who self-harm, while ensuring NHS resources are used efficiently. Therefore, they agreed to make a strong (offer) recommendation, to ensure the widespread use of CBT-informed psychological intervention for care management of adults who had self-harmed across NHS services. Based on their expertise, the results of the clinical review and the base-case and sensitivity analysis of the respective guideline economic model, they recommended that CBT-informed psychological intervention be typically delivered over a range between 4 and 10 individual sessions. The committee noted that more than 10 individual sessions of CBT-informed psychological intervention are unlikely to be cost-effective at the NICE lower cost-effectiveness threshold, nevertheless, they expressed the view that, for a minority of people who self-harm, more than 10 sessions may be essential for their improvement, and therefore decided to include in the recommendation the option of more sessions for some adults, dependent on their individual needs, in order to cover the whole population of adults who self-harm.

The committee discussed the findings of the second guideline economic analysis performed on this topic. They noted that findings suggested that DBT-A for CYP who have self-harmed is not cost-effective from a NHS and personal social services perspective, compared to enhanced TAU. Therefore, based on their expertise, the results of the clinical review and the DBT-A economic model, they recognised that recommending a typical mode of delivery of the DBT-A intervention for the whole population of CYP who self-harm was not an efficient use of resources. However, they acknowledged the important role likely to be played by DBT-A in the management of self-harm recurrence in a number of subgroups of CYP who self-harm, such as those CYP with significant emotional dysregulations who have frequent episodes of self-harm. For this reason, they agreed to make a weaker (‘consider’) recommendation to ensure that DBT-A is used for care management of CYP with significant emotional dysregulations who have frequent episodes of self-harm.

The recommendations should increase the number of people receiving psychological interventions after an episode of self-harm, and reduce the number of people denied appropriate interventions because of limited or no availability. In turn, this should reduce repeat self-harm and suicide, and improve satisfaction and engagement with services.

The committee acknowledged that the recommendations for CBT-informed psychological intervention for adults and DBT-A for CYP are likely to increase overall costs related to the provision of psychological interventions to people who self-harm, if CBT-informed psychological interventions and DBT A are offered to more service users. There is also a likely resource impact depending on how many centres do not currently offer these therapies. The committee advised that for services that do not currently offer these therapies, training and additional staffing may be needed for these interventions to be available to all eligible service users.

Recommendations supported by this evidence review

This evidence review supports recommendations 1.11.1 to 1.11.9 and research recommendation 4: the effectiveness of specific psychological interventions, including digital vs face-to face. Other evidence supporting these recommendations can be found in the evidence reviews on involving families and carers (evidence report D).

References – included studies

Effectiveness

Witt 2021a

Witt KG, Hetrick SE, Rajaram G, Hazell P, Taylor Salisbury TL, Townsend E, Hawton K. Psychosocial interventions for self-harm in adults. Cochrane Database of Systematic Reviews 2021, Issue 4. Art. No.: CD013668. DOI: 10.1002/14651858.CD013668.pub2.

Witt 2021b

Witt KG, Hetrick SE, Rajaram G, Hazell P, Taylor Salisbury TL, Townsend E, Hawton K. Interventions for self-harm in children and adolescents. Cochrane Database of Systematic Reviews 2021, Issue 3. Art. No.: CD013667. DOI: 10.1002/14651858.CD013667.pub2.

Economic

Byford 1999

Byford S, Harrington R, Torgerson D, Kerfoot M, Dyer E, Harrington V, Woodham A, Gill J, McNiven F. Cost-effectiveness analysis of a home-based social work intervention for children and adolescents who have deliberately poisoned themselves. Results of a randomised controlled trial. Br J Psychiatry 1999;174:56-62.

Byford 2003

Byford S, Knapp M, Greenshields J, Ukoumunne OC, Jones V, Thompson S, Tyrer P, Schmidt U, Davidson K; POMACT Group. Cost-effectiveness of brief cognitive behaviour therapy versus treatment as usual in recurrent deliberate self-harm: a decision-making approach. Psychol Med. 2003;33(6):977-86.

Cottrell 2018

Cottrell DJ, et al. A pragmatic randomised controlled trial and economic evaluation of family therapy versus treatment as usual for young people seen after second or subsequent episodes of self-harm: the Self-Harm Intervention - Family Therapy (SHIFT) trial. Health Technol Assess. 2018;22(12):1-222.

Green 2011

Green JM, Wood AJ, Kerfoot MJ, Trainor G, Roberts C, Rothwell J, Woodham A, Ayodeji E, Barrett B, Byford S, Harrington R. Group therapy for adolescents with repeated self harm: randomised controlled trial with economic evaluation.BMJ 2011;342:d682.

Haga 2018

Haga E, Aas E, Grøholt B, Tørmoen AJ, Mehlum L. Cost-effectiveness of dialectical behaviour therapy vs. enhanced usual care in the treatment of adolescents with self-harm. Child Adolesc Psychiatry Ment Health. 2018;12:22. Published 2018 Apr 30. doi:10.1186/s13034-018-0227-2

O'Connor 2017

O'Connor RC, Ferguson E, Scott F, et al. A brief psychological intervention to reduce repetition of self-harm in patients admitted to hospital following a suicide attempt: a randomised controlled trial. Lancet Psychiatry. 2017;4(6):451-460. doi:10.1016/S2215-0366(17)30129-3

Owens 2020

Owens D, Wright-Hughes A, Graham L, Blenkiron P, Burton K, Collinson M, Farrin A, Hatcher S, Martin K, O'Dwyer J, Pembroke L, Protheroe D, Tubeuf S, House A. Problem-solving therapy rather than treatment as usual for adults after self-harm: a pragmatic, feasibility, randomised controlled trial (the MIDSHIPS trial). Pilot Feasibility Stud. 2020;6:119.

Priebe 2012

Priebe S, Bhatti N, Barnicot K, Bremner S, Gaglia A, Katsakou C, Molosankwe I, McCrone P, Zinkler M. Effectiveness and cost-effectiveness of dialectical behaviour therapy for self-harming patients with personality disorder: a pragmatic randomised controlled trial. Psychother Psychosom 2012;81(6):356-65.

Wijana 2021

Wijana MB, Feldman I, Ssegonja R, Enebrink P, Ghaderi A. A pilot study of the impact of an integrated individual- and family therapy model for self-harming adolescents on overall healthcare consumption. BMC Psychiatry 2021;21(1):374.

Other

Harrington 1998

Harrington R, Kerfoot M, Dyer E, McNiven F, Gill J, Harrington V, Woodham A, Byford S. Randomized trial of a home-based family intervention for children who have deliberately poisoned themselves. J Am Acad Child Adolesc Psychiatry 1998;37 (5):512-8.

Mehlum 2016

Mehlum L, Ramberg M, Tørmoen AJ, Haga E, Diep LM, Stanley BH, Miller AL, Sund AM, Grøholt B. Dialectical Behavior Therapy Compared With Enhanced Usual Care for Adolescents With Repeated Suicidal and Self-Harming Behavior: Outcomes Over a One-Year Follow-Up. J Am Acad Child Adolesc Psychiatry 2016;55(4):295-300.

Tyrer 2003

Tyrer P, Thompson S, Schmidt U, Jones V, Knapp M, Davidson K, Catalan J, Airlie J, Baxter S, Byford S, Byrne G, Cameron S, Caplan R, Cooper S, Ferguson B, Freeman C, Frost S, Godley J, Greenshields J, Henderson J, Holden N, Keech P, Kim L, Logan K, Manley C, MacLeod A, Murphy R, Patience L, Ramsay L, De Munroz S, Scott J, Seivewright H, Sivakumar K, Tata P, Thornton S, Ukoumunne OC, Wessely S. Randomized controlled trial of brief cognitive behaviour therapy versus treatment as usual in recurrent deliberate self-harm: the POPMACT study. Psychol Med 2003;33(6):969-76.

Appendices

Appendix A Review protocols

Review protocol for review question: What psychological and psychosocial interventions (including safety plans and electronic health-based interventions) are effective for people who have self-harmed?

See the Cochrane review protocols for Psychosocial interventions for self-harm in adults and Interventions for self-harm in children and adolescents.

Appendix B Literature search strategies

Literature search strategies for review question: What psychological and psychosocial interventions (including safety plans and electronic health-based interventions) are effective for people who have self-harmed?

Clinical

See Appendix 1 and Appendix 2 of the Cochrane review of Psychosocial interventions for self-harm in adults and the Appendix 1 and Appendix 2 of the Cochrane review of Interventions for self-harm in children and adolescents.

Economic

A global, population based search was undertaken to find for economic evidence covering all parts of the guideline.

Database(s): MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily – OVID interface

Date of last search: 12th August 2021

#	Searches
1	poisoning/ or exp self-injurious behavior/ or self mutilation/ or suicide/ or suicidal ideation/ or suicide, attempted/ or suicide, completed/
2	(automutilat* or auto mutilat* or cutt* or (self adj2 cut*) or selfdestruct* or self destruct* or selfharm* or self harm* or selfimmolat* or self immolat* or selfinflict* or self inflict* or selfinjur* or self injur* or selfmutilat* or self mutilat* or selfpoison* or self poison* or selfwound* or self wound* or suicid*).ti,ab.
3	or/1-2
4	Economics/
5	Value of life/
6	exp "Costs and Cost Analysis"/
7	exp Economics, Hospital/
8	exp Economics, Medical/
9	Economics, Nursing/
10	Economics, Pharmaceutical/
11	exp "Fees and Charges"/
12	exp Budgets/
13	budget*.ti,ab.
14	cost*.ti.
15	(economic* or pharmaco?economic*).ti.
16	(price* or pricing*).ti,ab.
17	(cost* adj2 (effective* or utilit* or benefit* or minimi* or unit* or estimat* or variable*)).ab.
18	(financ* or fee or fees).ti,ab.
19	(value adj2 (money or monetary)).ti,ab.
20	Quality-Adjusted Life Years/

#	Searches
21	Or/4-20
22	3 and 21
23	limit 22 to yr="2000 -current"

Database(s): Embase and Emcare – OVID interface

Date of last search: 12th August 2021

#	searches
1	automutilation/ or exp suicidal behavior/
2	(auto mutilat* or automutilat* or self cut* or selfcut* or self destruct* or selfdestruct* or self harm* or selfharm* or self immolat* or selfimmolat* or self inflict* or selfinflict* or self injur* or selfinjur* or self mutilat* or selfmutilat* or self poison* or selfpoison* or suicid*).ti,ab.
3	or/1-2
4	health economics/
5	exp economic evaluation/
6	exp health care cost/
7	exp fee/
8	budget/
9	funding/
10	budget*.ti,ab.
11	cost*.ti.
12	(economic* or pharmaco?economic*).ti.
13	(price* or pricing*).ti,ab.
14	(cost* adj2 (effective* or utilit* or benefit* or minimi* or unit* or estimat* or variable*)).ab.
15	(financ* or fee or fees).ti,ab.
16	(value adj2 (money or monetary)).ti,ab.
17	Quality-Adjusted Life Year/
18	Or/4-17
19	3 and 18
20	limit 19 to yr="2000 -current"

Database(s): Cochrane Library - Wiley interface

Cochrane Central Register of Controlled Trials, Issue 8 of 12, August 2021

Date of last search: 12th August 2021

#	Searches
1	MeSH descriptor: [poisoning] this term only
2	MeSH descriptor: [self-injurious behavior] explode all trees
3	MeSH descriptor: [self mutilation] this term only
4	MeSH descriptor: [suicide] this term only
5	MeSH descriptor: [suicidal ideation] this term only
6	MeSH descriptor: [suicide, attempted] this term only
7	MeSH descriptor: [suicide, completed] this term only
8	(automutilat* or "auto mutilat*" or cutt* or (self near/2 cut*) or selfdestruct* or "self destruct*" or selfharm* or "self harm*" or selfimmolat* or "self immolat*" or selfinflict* or "self inflict*" or selfinjur* or "self injur*" or selfmutilat* or "self mutilat*" or selfpoison* or "self poison*" or selfwound* or "self wound*" or suicid*):ti,ab.
9	{or #1-#8}
10	MeSH descriptor: [Economics] this term only
11	MeSH descriptor: [Value of life] this term only
12	MeSH descriptor: [Costs and Cost Analysis] explode all trees
13	MeSH descriptor: [Economics, Hospital] explode all trees
14	MeSH descriptor: [Economics, Medical] explode all trees
15	MeSH descriptor: [Economics, Nursing] this term only
16	MeSH descriptor: [Economics, Pharmaceutical] this term only
17	MeSH descriptor: [Fees and Charges"]
18	MeSH descriptor: [Budgets] this term only
19	budget*:ti,ab.
20	cost*.ti.
21	(economic* or pharmaco?economic*):ti.
22	(price* or pricing*):ti,ab.
23	(cost* near/2 (effective* or utilit* or benefit* or minimi* or unit* or estimat* or variable*)):ab.
24	(financ* or fee or fees):ti,ab.
25	(value near/2 (money or monetary)):ti,ab.
26	MeSH descriptor: [Quality-Adjusted Life Years] this term only
27	{OR #10-#26}
28	(#9 and #27) with Cochrane Library publication date Between Jan 2000 and Aug 2021

Database(s): NHS EED and HTA – CRD interface

Date of last search: 12th August 2021

#	Searches
1	MeSH descriptor: poisoning IN NHSEED, HTA

#	Searches
2	MeSH descriptor: self-injurious behavior EXPLODE ALL TREES IN NHSEED, HTA
3	MeSH descriptor: self mutilation IN NHSEED, HTA
4	MeSH descriptor: suicide IN NHSEED, HTA
5	MeSH descriptor: suicidal ideation IN NHSEED, HTA
6	MeSH descriptor: suicide, attempted IN NHSEED, HTA
7	MeSH descriptor: suicide, completed IN NHSEED, HTA
8	(automutilat* or "auto mutilat*" or cutt* or (self near2 cut*) or selfdestruct* or "self destruct*" or selfharm* or "self harm*" or selfimmolat* or "self immolat*" or selfinflict* or "self inflict*" or selfinjur* or "self injur*" or selfmutilat* or "self mutilat*" or selfpoison* or "self poison*" or selfwound* or "self wound*" or suicid*) IN NHSEED, HTA
9	(#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8) from 2000 to 2021

Appendix C Results of the search

Results of the search for review question: What psychological and psychosocial interventions (including safety plans and electronic health-based interventions) are effective for people who have self-harmed?

Clinical

See Results of the search – figure 1 from the Cochrane review of Psychosocial interventions for self-harm in adults and Results of the search – figure 1 from the Cochrane review of Interventions for self-harm in children and adolescents.

Appendix D Characteristics of studies tables

Characteristics of studies tables for review question: What psychological and psychosocial interventions (including safety plans and electronic health-based interventions) are effective for people who have self-harmed?

See the Characteristics of included studies tables from the Cochrane review of Psychosocial interventions for self-harm in adults and the Characteristics of included studies tables from the Cochrane review of Interventions for self-harm in children and adolescents.

Appendix E Data and analyses

Data and analyses for review question: What psychological and psychosocial interventions (including safety plans and electronic health-based interventions) are effective for people who have self-harmed?

See the Data and analyses tables from the Cochrane review of Psychosocial interventions for self-harm in adults and the Data and analyses tables from the Cochrane review of Interventions for self-harm in children and adolescents.

Appendix F Summary of findings tables

Summary of findings tables for review question: What psychological and psychosocial interventions (including safety plans and electronic health-based interventions) are effective for people who have self-harmed?

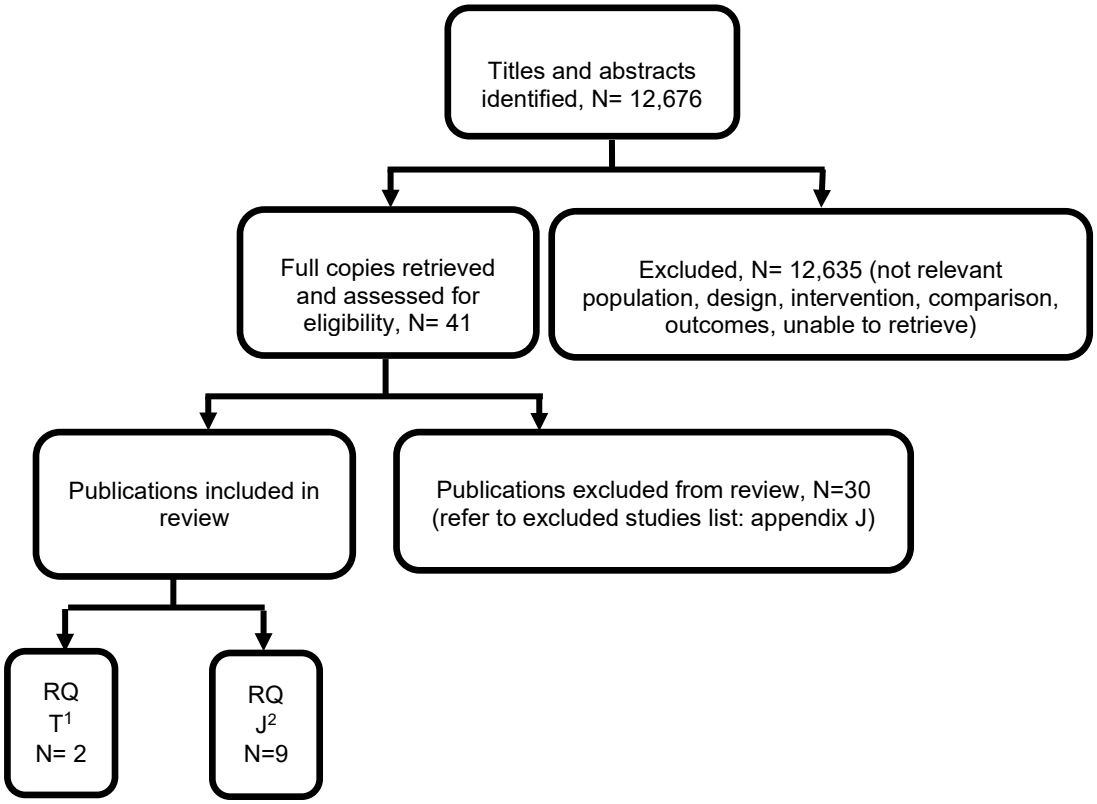
See the Summary of findings tables from the Cochrane review of Psychosocial interventions for self-harm in adults and the Summary of findings tables from the Cochrane review of Interventions for self-harm in children and adolescents.

Appendix G Economic evidence study selection

Study selection for review question: What psychological and psychosocial interventions (including safety plans and electronic health-based interventions) are effective for people who have self-harmed?

A global health economics search was undertaken for all areas covered in the guideline. Figure 1 shows the flow diagram of the selection process for economic evaluations of interventions and strategies associated with the care of people who have self-harmed.

Figure 1: Flow diagram of economic article selection for global health economic search



Abbreviations: RQ: Research question
Notes:
1 What are the most effective models of care for people who have self-harmed?
2 What psychological and psychosocial interventions (including safety plans and electronic health-based interventions) are effective for people who have self-harmed?

Appendix H Economic evidence tables

Economic evidence tables for review question: What psychological and psychosocial interventions (including safety plans and electronic health-based interventions) are effective for people who have self-harmed?

Economic evidence tables for adults who have self-harmed

Table 11: Economic evidence tables for psychological and psychosocial interventions for adults who have self-harmed

Study Country Study design	Interventions details:	Study population Data sources	Costs: description and values Outcomes: description and values	Results: Cost-effectiveness	Comments
• Byford 2003 • UK • Cost-effectiveness and cost-utility analysis	• CBT - MACT: Up to seven treatment sessions of manual-based CBT with a trained therapist over 3 months • TAU: The standard treatment varied by area, and included problem solving, psychotherapy, primary care or voluntary group referral, and short-term counselling	• Study population: Adults (N=397) presenting with an episode of deliberate self-harm aged 16 to 65 years who did not require hospital psychiatric treatment • Data sources: ○ Source of clinical effectiveness data: RCT (Tyrer 2003) ○ Source of utility data: EQ-5D 3L (Health Policy 1996; 37, 53-72) ○ Source of resource use data: RCT, collected using patient self-reported	• Cost description: ○ Cost categories included: - Health and social care services - Voluntary sector services - Community accommodation - Criminal justice system - Productivity losses - Patient living expenses. ○ Costs Values (incremental mean cost of MACT *versus* TAU): - -£897 (95% CI: -£1,747 to -£48) - at 6 months - -£838 (95% CI: -£2,212 to £466) - at 12 months - -£778 – 12 months (only includes people who had	• ICER ○ MACT dominant at 6 and 12 months follow-up using SH outcome ○ Cost savings of £66,000/QALY lost (incremental mean costs = -£778; incremental mean effects = -0.0118) • Sensitivity analysis: ○ PSA - Using self-harm outcome, the probability of MACT being cost-effective (vs TAU) exceeded 90% - Using a threshold of cost savings of	• Perspective: Societal, public sector in sensitivity analysis • Currency: GBP £ • Cost year: 1999-2000 • Time horizon: 6 and 12 months • Discounting: N/A • Applicability: Directly applicable • Quality: Potentially serious limitations • Other comments: Bootstrapping was undertaken to estimate the distribution of costs and outcomes

Study Country Study design	Interventions details:	Study population Data sources	Costs: description and values Outcomes: description and values	Results: Cost-effectiveness	Comments
		questionnaire (Beecham J, Knapp M. Costing psychiatric interventions.2001; 200–224. Gaskell: London) ○ Source of unit costs: UK national sources	corresponding EQ-5D data, and excludes productivity costs) • Outcomes: ○ Outcomes considered: - Proportion of patients who experienced an episode of self-harm - QALYs ○ Outcome Values (incremental mean effect [MACT vs TAU]): - Proportion self-harm: -1% at 6 months (reduction) -7% at 12 months (reduction, no details on statistical significance reported) - QALYs: NR at 6 months -0.0118 at 12 months (reduction, no further details reported)	£20,000/QALY lost, MACT had approximately 68% probability of being cost-effective. ○ Deterministic - The costings were robust to the underlying assumptions, such as: 1) including all national unit costs 2) excluding productivity losses 3) excluding domestic accommodation costs 4) including costs of court appearances	
• O'Connor 2017 • UK	• VHS + TAU: The VHS began with instructions including a brief statement	• Study population: Adults (N=518) presenting with an episode of deliberate self-harm aged over	• Cost description: ○ Cost categories included: - NHS care services - Intervention cost	• ICER ○ VHS+TAU dominant (it is less costly and more effective)	• Perspective: NHS • Currency: GBP £ • Cost year: 2013-2014

Study Country Study design	Interventions details:	Study population Data sources	Costs: description and values Outcomes: description and values	Results: Cost-effectiveness	Comments
• Cost-effectiveness analysis	encouraging people to plan to stop self-harming and asked them to read through a list of common situations in which people are tempted to self-harm and a list of potential solutions • TAU alone: Included a psychosocial assessment that was done by the Liaison Psychiatry service	16 years who had had at least one previous self-reported episode of self-harm • Data sources: ○ Source of clinical effectiveness data: RCT (O'Connor 2017) ○ Source of utility data: N/A ○ Source of resource use data: Ad-hoc sources for the VHS intervention delivery (based on consultation with clinicians at the Edinburgh Royal Infirmary), for the NHS service use study participants medical records ○ Source of unit costs: - UK national sources - Expert opinion	○ Costs Values: - VHS+TAU: £513 (SD=1,837) - TAU: £561 (SD=1,696); - Difference: -£48 (95% CI –£353 to £257, p=0.76) • Outcomes ○ Outcomes considered: - Primary outcome was self-harm re-presentation in the 6 months following the index presentation (any self-harm, such as overnight hospitalisation or emergency department presentation) ○ Outcome Values: - VHS+TAU: 26% (67 of 254 patients) - TAU: 28% (71 of 258 patients) - Difference: -2%	• Sensitivity analysis: ○ PSA - The probability that VHS+TAU (vs TAU) is cost effective is 50% for willingness to pay values ranging from £0 to £100,000 per self-harm representation avoided. ○ Deterministic - The costings performed were robust to the underlying assumptions about the study population: 1) considering only those who completed the VHS in hospital. 2) stratifying according to the presence of SH history.	• Time horizon: 6 months • Discounting: N/A • Applicability: Directly applicable • Quality: Minor limitations • Other comments: Bootstrapping was undertaken to estimate the distribution of costs and outcomes
• Owens 2020 • UK	• PST + TAU: 6 therapy sessions,	• Study population: Adults (N=62) with an	• Cost description: ○ Cost categories included:	• ICER	• Perspective: NHS and PSS

Study Country Study design	Interventions details:	Study population Data sources	Costs: description and values Outcomes: description and values	Results: Cost-effectiveness	Comments
• Cost-utility analysis	each lasting 1 hour, with an additional 'booster' session, if required 6 to 8 weeks later. • TAU: No aftercare after attending hospital for self-harm although some followed-up in general psychiatric outpatient clinics or referred to specialist services such as those dealing with drug and alcohol use; return of patients to the care of their general practitioner is the most usual form of TAU.	episode of self-harm, aged over 18 years • Data sources: ○ Source of clinical effectiveness data: RCT (Owens 2020) ○ Source of utility data: Utilities were generated from the SF-6D preference-based measure (Journal Health Economics. 2002;21:271-92) ○ Source of resource use data: RCT ○ Source of unit costs: UK national sources	- NHS care services - TAU costs - PST intervention ○ Costs Values: - 3 months PST+TAU: £ 3,964 (SD N/R) TAU: £ 6,038 (SD N/R) - 6 months PST+TAU: £ 4,253 (SD N/R) TAU: £ 5,678 (SD N/R) ○ Difference in costs, controlling for baseline differences: - 3 months: £ -2,074 (95% CI, N/R) - 6 months: £ -1,425 (95% CI, N/R) • Outcomes: ○ Primary outcome: QALYs ○ Outcome Values (Difference in QALYs): - 0.0149 at 3 months - 0.0203 at 6 months	○ PST+TAU dominant (it is less costly and more effective) • Sensitivity analysis: ○ PSA - Not reported ○ Deterministic - Conclusions unchanged when intervention cost excluded booster session	• Currency: GBP £ • Cost year: 2013-2014 • Time horizon: 3 and 6 months • Discounting: N/A • Applicability: Directly applicable • Quality: Potentially serious limitations
• Priebe 2012 • UK	• DBT: 12 month manual-based	• Study population: Adults (N=80) with an	• Cost description: ○ Cost categories included:	• ICER	• Perspective: Societal • Currency: GBP £

Study Country Study design	Interventions details:	Study population Data sources	Costs: description and values Outcomes: description and values	Results: Cost-effectiveness	Comments
• Cost-effectiveness analysis	DBT. It consisted of weekly hour-long individual therapy sessions, a weekly 2-hour skills training group session, and out-of-hours skills coaching over the telephone as needed • TAU: '*It reflected the heterogeneous and multidisciplinary nature of the health services received by patients with BPD in the NHS'* (page 358)	episode of deliberate self-harm aged over 16 years who had a diagnosis of a personality disorder. • Data sources: ○ Source of clinical effectiveness data: RCT (Priebe 2012) ○ Source of utility data: N/A ○ Source of resource use data: RCT–Family carers self-reported questionnaire and audit of clinical medical records (Beecham J, Knapp M. Costing psychiatric interventions.2001; 200–224. Gaskell: London) ○ Source of unit costs: UK national sources	- Psychotherapy - Hospital services - Out-patient services - Community services - Lost work ○ Costs Values: - Total mean cost per adult: - DBT: £ 5,685 (SD 6,431) - TAU: £ 3,754 (SD 6,045) - Difference (controlling for baseline differences): £3,029 (95% CI 476 to 5,583) • Outcomes: ○ Primary outcome: Re-presentation for self-harm, measured in number of days of self-harm over the 12-month follow-up. ○ Outcome Values: - No data reported: "the incidence rate of self-harm per 2-month period decreased by an additional 9% in the DBT group compared to the TAU group." (page 360)	○ £36 per 1% reduction in the incidence of self-harm or £ 3,600 per case of self-harm prevented for 2 months • Sensitivity analysis: ○ PSA - Not reported ○ Deterministic - The sensitivity analysis with last observation carried forward showed a very similar result to the base-case analysis (IRR=0.91; p <0.001)	• Cost year: 2009-2010 • Time horizon: 12 months • Discounting: N/A • Applicability: Partially applicable • Quality: Potentially serious limitations

Abbreviations: BPD: Borderline personality disorder; CBT: Cognitive behaviour therapy; CI: Confidence interval; DBT: Dialectical behaviour therapy; EQ-5D: EuroQol 5 Dimensions; GBP £: British pound sterling; ICER: Incremental cost-effectiveness ratio; IRR: Incidence rate ratio; MACT: Manual-assisted cognitive behaviour therapy; N/A: No

applicable; N/R: Not reported; PSA: Probabilistic sensitivity analysis; PST: Problem solving therapy; QALY: Quality-adjusted life-year; RCT: Randomised control trial; SD: Standard deviation; SH: Self-harm; TAU: Treatment-as-usual; VHS: Volitional help sheet.

Economic evidence tables for children and young people who have self-harmed

Table 12: Economic evidence tables for psychological and psychosocial interventions for children and young people who have self-harmed

Study Country Study design	Interventions details:	Study population Data sources	Costs: description and values Outcomes: description and values	Results: Cost-effectiveness	Comments
• Byford 1999 • UK • Cost-effectiveness analysis	• SWI + TAU: Home-based social work intervention (in addition to TAU) – four intensive, family-centred home-based intervention sessions • TAU: Routine clinical assessment and psychiatric care, out-patient clinic visits	• Study population: Adolescents and young people (N=162) aged 10 to 16 years, who were referred to mental health care teams with diagnosis of self-poisoning • Data sources: ○ Source of clinical effectiveness data: RCT (Harrington 1998) ○ Source of utility data: N/A ○ Source of resource use data: RCT, collected using Client Service Receipt Inventory and patient self-	• Cost description: ○ Cost categories included: - NHS care services - Education - Social care services - SWI intervention ○ Costs Values: - SWI+TAU: £1,455 (95% CI 1,088 to 1,823) - TAU: £1,751 (95% CI 1,169 to 2,334) - The difference: -£296, p = ns • Outcomes ○ Outcomes considered: - Suicidal Ideation Questionnaire, the Hopelessness Scale, and the Family Assessment Device ○ Outcome Values:	• ICER ○ No synthesis of costs and outcomes performed by authors, however the intervention was cost saving or preferred based on the cost-minimisation • Sensitivity analysis: ○ PSA - Only total costs were tested for statistical significance. ○ Deterministic - Excluding cost of intervention the difference in costs becomes significant - Changing assumptions made	• Perspective: Public sector • Currency: GBP £ • Cost year: 1997-1998 • Time horizon: 6 months • Discounting: N/A • Applicability: Directly applicable • Quality: Potentially serious limitations • Other comments: Bootstrapping was undertaken to estimate the distribution of costs

Study Country Study design	Interventions details:	Study population Data sources	Costs: description and values Outcomes: description and values	Results: Cost-effectiveness	Comments
		reported questionnaire ○ Source of unit costs: UK national sources	- No data reported: "no statistically significant differences detected between intervention and control groups for any of the main outcome measures or the secondary outcome measures "(page 57)	on cost estimation, did not impact the results, such as: 1) varying professional staff overhead costs 2) varying unit cost of therapist delivering the intervention 3) varying hospital costs 4) including costs associated with those who failed to attend treatment • Sub-group analysis ○ In the subgroup of children and adolescents without a diagnosis of major depression, the SWI was likely to be cost-effective	
• Cottrell 2018 • UK • Cost-utility analysis	• FT: 8 monthly sessions delivered by trained and qualified systemic	• Study population: adolescents (N=832) aged 11 to 17 years who self-harmed prior	• Cost description: ○ Cost categories included: - Health community and social care services	• ICER ○ Primary analysis (at 18 months): £36,812/QALY gained	• Perspective: NHS and PSS • Currency: GBP £ • Cost year: 2014

Study Country Study design	Interventions details:	Study population Data sources	Costs: description and values Outcomes: description and values	Results: Cost-effectiveness	Comments
	family therapists, working in teams of 3 or 4 • TAU: Consisted of the care offered by local CAMHS teams to young people referred following self-harm	to assessment by the CAMHS team • Economic evaluation alongside an RCT, with modelling (Markov decision model) of long term costs and outcomes • Data sources: ○ Source of clinical effectiveness data: RCT ○ Source of utility data: HRQoL was assessed using the EQ-5D 3L (Journal of Mental Health 2013;22:101-10; Health Policy 1990;16:199-208). ○ Source of resource use data: RCT, collected using Client Service Receipt Inventory and patient self-reported questionnaire ○ Source of unit costs: UK national sources	- Hospital services self-harm related - Hospital services not self-harm related - Medication use - Intervention costs ○ Costs Values (Total costs per patient): - Primary analysis (at18 months): 1) FT: £4,992 (SD 3,767) 2) TAU: £3,725 (SD 3,786) 3) Difference: £1,266 (95% CI: 736 to 1,796) - Secondary analysis (at 5 years): 1) FT: £11,564 (SD 8,111) 2) TAU: £11,030 (SD 11,092) 3) Difference: £1,262 (95% CI: 1,107 to £1,417) • Outcomes: ○ QALYs: - Primary analysis (at 18 months): 1) FT: 1.157 (SD 0.223) 2) TAU: 1.122 (SD 0.203)	○ Secondary analysis (at 5 years): £19,488/QALY gained • Sensitivity analysis: ○ PSA - Primary analysis (at 18 months) – at a willingness to pay (WTP) of £20,000-30,000/QALY, FT had a 12-36% chance of being cost-effective. - Secondary analysis (at 5 years) – at a WTP of £20,000-30,000/QALY, FT had a 50-52% chance of being cost-effective. ○ Deterministic - The results were robust to changes in the number of therapists involved in each of the treatment sessions in the FT arm, QALY estimation (such as accounting for EQ-5D	• Time horizon: Primary analysis: 18 months; secondary analysis: 5 years • Discounting: 3.5% for costs and outcomes • Applicability: Directly applicable • Quality: Minor limitations • Other comments: Bootstrapping was undertaken to estimate the distribution of costs and outcomes at 18 months

Study Country Study design	Interventions details:	Study population Data sources	Costs: description and values Outcomes: description and values	Results: Cost-effectiveness	Comments
			Difference: 0.034 (95% CI:–0.004 to 0.065) - Secondary analysis (at 5 years): 1) FT: 4.251 (SD=0.698) 2) TAU: 4.187 (SD=0.203) 3) Difference: 0.065 (95% CI: 0.053 to 0.075)	differences between arms at baseline, including caregivers' QALY gains), and using only complete case data	
• Green 2011 • UK • Cost-effectiveness analysis	• Manual-based developmental group psychotherapy programme + TAU: Six weekly sessions followed by a booster of weekly sessions as long as needed, incorporating CBT, DBT and group psychotherapy techniques • TAU: Local child and adolescent mental health services teams provided standard routine care	• Study population: Adolescents (N=366) aged 12 to 17 years with at least two past episodes of self-harm within the previous 12 months • Data sources: ○ Source of clinical effectiveness data: RCT (Green 2011) ○ Source of utility data: N/A ○ Source of resource use data: RCT, collected using Child and Adolescent Service Use Schedule (The British Journal of Psychiatry	• Cost description: ○ Cost categories included: - NHS care services - Social care services - Education services - Voluntary services and criminal justice services - Others: travel costs and productivity losses ○ Costs Values (Total cost per adolescent at 12 months): - Group therapy + TAU: £21,781 (SD £38,794) - TAU: £15,372 (SD £24,981) - Difference: £6,383 (95% CI −13,732 to 965) - Outcomes: • Outcomes	• ICER ○ £2,020 per 1% increase in the proportion of adolescents not self-harming. • Sensitivity analysis: ○ PSA - The probability of group therapy being cost-effective ranges from 12% to 28% as willingness to pay (WTP) for outcome improvement increases (values of WTP not reported) ○ Deterministic - The results were largely unchanged when including	• Perspective: Public sector (main analysis), societal (sensitivity analysis) • Currency: GBP £ • Cost year: 2005-2006 • Time horizon: 12 months • Discounting: N/A • Applicability: Directly applicable • Quality: Minor limitations • Other comments: Bootstrapping was undertaken to estimate the distribution of costs and outcomes

Study Country Study design	Interventions details:	Study population Data sources	Costs: description and values Outcomes: description and values	Results: Cost-effectiveness	Comments
	according to their clinical judgment	1999;174:56-62; The British Journal of Psychiatry 2006;188:541-6, and The British Journal of Psychiatry 2007;191:521-7) ○ Source of unit costs: UK national sources	○ Outcome considered: Frequency of self-harm episodes – Proportion of adolescents who had not harmed themselves over the preceding six months (at 12 month follow-up). ○ Outcome Values: - Group therapy: 41.9% (75 of 179 patients) - TAU: 38.9% (70 of 180 patients) - Difference: 3%	parental travel/productivity losses, and using multiple imputation for missing data.	
• Haga 2018 • Norway • Cost-effectiveness analysis	• DBT-A: 19 weeks of weekly sessions (60 min) of individual therapy and weekly sessions (120 min) of skills training in a multifamily format. Family therapy sessions and telephone coaching were provided as needed according to the DBT-A protocol.	• Study population: Adolescents (N=77) aged 12 to 18 years with at least two past episodes of self-harm, and meeting at least three criteria of BPD • Data sources: ○ Source of clinical effectiveness data: RCT (Mehlum 2016) ○ Source of utility data: N/A ○ Source of resource use data: RCT, collected using	• Cost description: ○ Cost categories included: - Outpatient care services - Emergency treatment due to self-harm or risk of self-harm ○ Costs values (Total cost per adolescent): - DBT-A: € 22,107 (SD 13,358); - EUC: € 29,912 (SD 40,179) - Difference: − € 7,805 (SE 6,860), p=0.508 • Outcomes:	• ICER ○ DBT-A dominant using both outcomes • Sensitivity analysis: ○ PSA - Mean number of self-harm episodes: 1) The probability of DBT-A being cost-effective compared to EUC is 97.5-99.5% at a willingness to pay (WTP) values of €400-1400 per self	• Perspective: Health care • Currency: EUR € • Cost year: 2012 • Time horizon: 71 weeks • Discounting: N/A • Applicability: Partially applicable • Quality: Potentially serious limitations • Other comments: Bootstrapping was undertaken to estimate the

Study Country Study design	Interventions details:	Study population Data sources	Costs: description and values Outcomes: description and values	Results: Cost-effectiveness	Comments
	• EUC: EUC was non-manualized, but was mainly psychodynamic or cognitive behaviour-oriented therapy, enhanced for the purpose of the trial through providing all therapists with training in suicide risk assessment	interviews and self-reported questionnaires ○ Source of unit costs: National Norwegian sources and some local, for example annual accounts of participating clinics	○ Outcomes considered: - Number of SH episodes - Change in CGAS score ○ Outcome Values: - Mean number of self-harm episodes 1) DBT-A: 15.0 (SD 17.5) 2) EUC: 37.5 (SD 52.9) 3) Difference: −22.5 (95% CI −40.6 to −4.3) - Mean change in CGAS scores (global functioning) 1) DBT-A: 10.4 (SD 13.4) 2) EUC: 6.3 (SD 14.9) 3) Difference: 4.1 (95% CI −2.3 to 10)	harm episode avoided. 2) DTB-A is dominant (vs EUC) in 89.7% of simulations using SH outcome (that is, DBT-A is more effective and less costly) - Mean change in CGAS scores 1) The probability of DBT-A being cost-effective compared to EUC is 94.9% at a WTP value of €1,600 per one point change on CGAS scale 2) DBT-A is dominant (vs EUC) in 78.7% of simulations using CGAS outcome (that is, DBT-A is more effective and less costly) ○ Deterministic - When considering only outpatient costs the DBT-A is likely to be more costly than	distribution of costs and outcomes

Study Country Study design	Interventions details:	Study population Data sources	Costs: description and values Outcomes: description and values	Results: Cost-effectiveness	Comments
				EUC (€ 1,713 [95% CI -4,049 to 7,045])	
• Wijana 2021 • Sweden • Cost-effectiveness analysis	• After ICT: A short-term (3 to 6 months) manualized psychiatric outpatient treatment consisting of one family session and one individual session per week. • Before ICT: Standard psychiatric outpatient care without the ICT treatment	• Young people aged 13–19 years with repetitive SH behaviour. • Source of effectiveness and resource use data: before-after study (before: n=25; after: n=25) • Source of unit costs: a mix of national and local sources	• Cost description: ○ Cost categories included: - Intervention cost - Healthcare services costs 1) Out-patient services 2) Community services 3) Hospital services - Medication costs ○ Costs Values – cost per person: - After ICT, mean (SD): €8,705 (9,684) - Before ICT, mean (SD): €8,716 (6,947) - Difference, mean (SE): -€11 (cost reduction) (2,211), p>0.05 • Outcomes: ○ Outcomes considered: Responders (measured using an improvement on DSHI and YSR scales) ○ Outcome Values – Treatment responders at 12 months follow-up:	• ICER ○ ICT dominant (lower cost and more responders), however cost difference was not significant • Sensitivity analysis: ○ Deterministic: - There was no difference in ICT intervention costs between responders (defined using YSR) (€5277) vs non-responder (€5334), p > 0.05. - The ICT intervention costs were higher for responders (defined using DSHI) (€6826) vs non-responders (€4572), p = 0.057.	• Perspective: Health care sector • Currency: EUR € • Cost year: 2019 • Time horizon: 12 months pre, and post • Discounting: N/A • Applicability: Partially applicable • Quality: Very serious limitations ○ Small pre-post study, unlikely to differentiate between changes arising from the intervention and changes unrelated to the intervention ○ Potential attrition bias, however the only statistically significant difference regarding demographic characteristics between the two

Study Country Study design	Interventions details:	Study population Data sources	Costs: description and values Outcomes: description and values	Results: Cost-effectiveness	Comments
			- DSHI: 32% (8/25 participants) - YSR: 72% (18/25 participants). Treatment responders pre-treatment - 28% (no further detail provided) Post-ICT there were 4-44% more responders depending on the measurement scale		groups was the proportion of parents who reported having a university education ○ Some local unit cost data

Abbreviations: BPD: Borderline personality disorder; CAMHS: Children and adolescent mental health services; CGAS: Children's Global Assessment Scale; CI: Confidence interval; DBT-A: Dialectical behaviour therapy for Adolescent; DSHI: deliberate self-harm inventory; EQ-5D: EuroQol 5 Dimensions; EUC: Enhanced usual care; EUR €: Euro; FT: Family therapy; GBP £: British pound sterling; HRQoL: Health-related quality of life; ICER: Incremental cost-effectiveness ratio; ICT: Intensive Contextual Treatment; N/A: Not applicable; P: P-value; PSA: Probabilistic sensitivity analysis; QALY: Quality-adjusted life-year; RCT: Randomised control trial; SD: Standard deviation; SE: Standard error; SH: Self-harm; SWI: Social work intervention; TAU: Treatment-as-usual; YSR: Youth self-report.

Appendix I Economic model

Economic models for review question: What psychological and psychosocial interventions (including safety plans and electronic health-based interventions) are effective for people who have self-harmed?

The committee and the guideline health economist identified the choice of psychological interventions in people who have self-harmed as an area with potentially major resource implications. Many economic evaluations in this area have been identified in the review of economic evidence for this topic. Most of this evidence was considered to have potentially serious limitations (Byford 1999, Byford 2003, Owens 2020 and Priebe 2012), though many studies were judged of higher methodological quality (Cottrell 2018, Green 2011, Haga 2018, and O'Connor 2017). When discussing this evidence, the committee noted that available economic evidence assessed a limited number of interventions and was often inconclusive or not applicable to the NICE decision-making context. Moreover, existing economic evidence was based on single studies, whereas the guideline was informed by two large systematic reviews and meta-analyses of RCTs of psychological and psychosocial therapies for children and adults who have self-harmed. Therefore, 2 bespoke economics models were developed, which were informed by Cochrane systematic reviews and meta-analyses, to increase the evidence base in order to assist the committee decision making for this area of the guideline. One economic analysis aimed to evaluate the relative cost-effectiveness of cognitive behavioural therapy (CBT)-informed psychological intervention in addition to TAU *versus* TAU alone for adults who repeated self-harm (RSH); the other economic analysis aimed to evaluate the cost-effectiveness of dialectical behavioural therapy adapted for adolescents (DBT-A) relatively to enhanced treatment as usual (TAU) for children and young people (CYP) who RSH; both analyses were placed in the UK. The models are described below ('CBT-informed psychological intervention for adults who have self-harmed', 'DBT-A for children and young people who have self-harmed').

CBT-informed psychological intervention for adults who have self-harmed

Objective of economic modelling

The Cochrane systematic review of clinical evidence (Witt 2021a) demonstrated that CBT-informed psychological intervention in addition to treatment as usual (TAU) for adults who RSH is effective in reducing the repetition of self-harm episodes when compared with TAU alone; in addition, the existing clinical evidence was deemed adequate to inform exploratory bespoke economic modelling. Based on these considerations, an economic model was developed to assess the relative cost-effectiveness of CBT-informed psychological intervention in addition to TAU *versus* TAU alone for adults who RSH in the UK.

Economic modelling methods

Population

The study population of the economic model comprised adults with a hospital presentation for self-harming in the prior six months; furthermore, people included in the economic model may have repeated single or multiple self-harm episodes in the past. The age of the population at the start of the model was 29 years, in accordance with a large UK-based prospective cohort study; 56% of the model's population were women (Cooper 2013, Cooper 2015). The starting age of the cohort and its gender composition were needed in order to estimate mortality risks in the cohort over the time horizon of the economic analysis.

Intervention

The economic analysis considered CBT-informed psychological intervention as this was the only intervention that was shown to be effective in reducing the number of future RSH episodes according to the Cochrane systematic review and meta-analysis of the clinical evidence (Witt 2021a). The characteristics of CBT-informed psychological intervention in terms of effectiveness and resource use (healthcare professional time, and number of sessions delivered), were determined by the findings of the Cochrane systematic review and meta-analysis that informed the review question and economic analysis, supplemented by the committee's expert opinion.

TAU was described as treatment provided by community mental health teams (CMHT) to adults who RSH after initial hospital management. As TAU was provided in both treatment arms, it was not costed.

Scope of the economic model

The economic analysis adopted the perspective of the NHS and personal social services (PSS), as recommended by NICE (NICE 2020). The measure of outcome was the Quality Adjusted Life Year (QALY), which incorporated utilities associated with repetition of self-harm health-related quality of life (HRQoL). Costs to the NHS & PSS consisted of CBT-informed psychological intervention costs (healthcare professional time and number of sessions delivered as part of intervention) and use of health and social care services (including primary care, hospital medical care, emergency department presentations, inpatient psychiatric care, outpatient psychiatric care, psychotropic prescriptions, and social care) by adults who have self-harmed. The cost year was 2020.

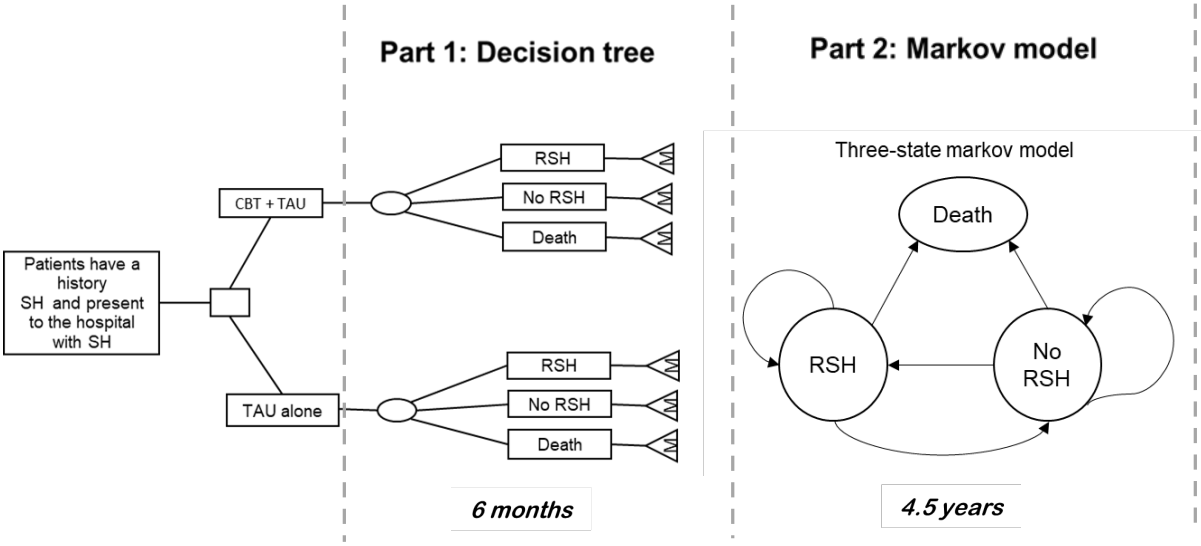
Model structure

Figure 2 presents a schematic diagram of the hybrid decision-analytic model developed using Microsoft Office Excel 2013; it consisted of a simple decision tree lasting 6 months incorporating Markov nodes (represented by 'M' in Figure 2– Part 1), and a Markov simulation model involving 3 health states (RSH, no RSH and death), which lasted 4.5 years with a 6-month cycle Figure 2 – Part 2). A 6-month cycle was used based on data availability and committee's advice that this is an appropriate period over which to model RSH events. A half-cycle correction was applied.

The structure of the model, which aimed to simulate the natural history of the adult self-harming population, was driven by patterns of clinical practice in the UK and the availability of relevant data sources (see section 'Development and validation of the economic model' for further details). The model estimated the total costs and effects associated with the provision of CBT-informed psychological intervention to adults who RSH. According to the model structure, hypothetical cohorts of adults who RSH were either initiated on CBT-informed psychological intervention in addition to TAU or received TAU alone. Following care received, adults either RSH, did not RSH or died, with 'death' taken as the absorbing state (Figure 2). Due to lack of long-term comparative clinical data, transitions between the 'RSH' and 'no RSH' health states in the Markov component of the model were assumed to be independent of the intervention received at the decision-tree part of the model. The transition probability to the death state depended on the RSH status of each person in the population.

The time horizon of the analysis was 5 years. This time frame was considered to be long enough to capture longer-term costs and effects of treatment, without significant extrapolation over the course of RSH.

Figure 2: Schematic structure of the economic model assessing the cost-effectiveness of CBT-informed psychological intervention for adults who RSH



CBT: cognitive behavioural therapy-informed psychological intervention; RSH: repeated self-harm; SH: self-harm; TAU: treatment-as-usual

Cost input parameters

Intervention costs

The intervention cost of CBT-informed psychological intervention was estimated by combining resource use associated with provision of CBT-informed psychological intervention with appropriate unit costs. It was assumed that the CBT-informed psychological intervention consisted of 6 sessions, which was the average intended number of sessions reported across studies informing the Cochrane systematic review and meta-analysis of clinical evidence (Witt 2021a). Based on this evidence and on the committee's advice on patterns of attendance of adult patients to CBT-informed psychological intervention's sessions in the UK, we estimated the proportions of people attending CBT-informed psychological intervention as reported in Table 13. By weighing the intended number of sessions with their likely attendance rates we obtained the average number of attended CBT-informed psychological intervention sessions in the model, which is 4.725 (this is the mean number of sessions likely to be provided based on the attendance rates of service users). Each CBT session was assumed to last 55 minutes and to be provided by a health professional in NHS England Agenda for Change (AfC) Band 6, usually a mental health nurse. Each CBT-informed psychological intervention session was assumed to be delivered individually and face-to-face.

Table 13: People attending CBT-informed psychological intervention sessions[1]

Number of sessions	Attendance rate
6 sessions (intended)	55%
3-5 sessions	30 %
1-2 sessions	15 %

1 the mean number of CBT-informed psychological intervention sessions estimated based on the attendance rates of service users and the distribution in the number of CBT-informed psychological intervention sessions attended, at 4.725 = 6 x 55% + 4 x 30% + 1.5 x 15%

In order to estimate the unit cost of the CBT-informed psychological intervention 4 main assumptions were made, according to the advice of the committee (Table 14):

- A Band 6 salary pay scale was used to estimate unit cost per hour worked by a professional delivering each session
- All staff delivering CBT-informed psychological intervention were assumed to be mental health nurses, in order to estimate qualification costs
- An additional training in CBT-informed psychological intervention was estimated to cost £2,000 according to the committee's expert advice
- The direct to indirect time of professionals delivering CBT-informed psychological intervention based on published estimates (Curtis and Burns 2020) was considered when estimating unit costs of professionals involved in delivering CBT-informed psychological intervention .

Table 14: Unit cost of qualified mental health nurses, AfC band 6 (2020 prices)

Cost element	Unit cost (annual)	Source
Wages – salary	£34,250	Curtis and Burns 2020; unit cost of community-based healthcare staff, including '10.1 Nurses' (AfC band 6)
Salary on-costs	£10,618	
Overheads – staff	£10,992	
Overheads - non-staff	£17,140	
Capital overheads	£4,471	
Qualifications	£8,917	Curtis and Burns 2020, 'Training costs of health and social care professionals', nurses: £8,744 per annum Training cost in CBT-informed psychological intervention: £173 per annum. Based on the committee's expert advice – training in CBT-informed psychological intervention £2,000 (one-off cost), annuitized assuming 42 years up to retirement and 23 years of useful working life, using the formula in Netten 1998
SUM of unit costs	£86,388	
Working time	41.9 weeks /year 37.5 hours /week (1,573 hours)	Curtis and Burns 2020
Total cost per hour	£54.92	
Ratio of direct to indirect time*	60:40	Assumption based on the committee's expert opinion
Estimated cost per hour of direct contact	£91.53	

AfC: Agenda for Change
** ratio of face-to-face time to time for preparation and other administrative tasks*

Details on the estimation of the cost of delivering CBT-informed psychological intervention (£396) are provided in Table 15.

Table 15: Mean cost of delivery of the CBT-informed psychological intervention

CBT-informed psychological intervention resource use	Cost
4.725[1] individual sessions x 55 minutes each, delivered by a band 6 mental health nurse at a unit cost of £91.53 per hour of direct contact[2]	£396

1 For details see Table 13
2 For details see Table 14
CBT: cognitive behavioural therapy

Healthcare costs associated with repeating self-harm

The estimation of costs incurred by an adult following an episode of RSH was based on a retrospective cost analysis by Sinclair (2011), conducted in the UK. This study followed a cohort of self-harming patients presenting to a general hospital (n=150), mostly following an episode of deliberate self-poisoning (94% of the sample), and estimated their care cost from the perspective of the NHS and social care, which was divided into 6-month cost intervals. Among the 150 participants recruited in the study, 78 service users with available resource use in each period were analysed; the mean length of time in follow-up from their first ever episode of self-harm was 10.5 years (range 2-25 years). Resources measured in the study included primary care services, emergency department services, hospital (both medical and surgical) services such as inpatient bed days, outpatient consultations, laboratory investigations, inpatient and outpatient psychiatric care, psychotropic prescriptions, social service visits and social service residential placements. The cost estimate was based on a regression analysis that reported the cost coefficient incurred by people who had self-harmed between 6 months – 1 year ago compared with people who had self-harmed within the last 6 months. This 6-month cost difference between the two population subgroups, which was reported at £1,689 in 2004/05 prices, was applied as an additional cost incurred by people who self-harmed in the past 6 months in the model relative to those who did not self-harm in the past 6 months (thus the cost of people who did not self-harm in the past 6 months in the model was zero). This estimate was inflated to 2020 price year using Hospital and Community Health Services pay and price inflator up to 2016 and the NHS Cost Inflation Index after that and up to 2020 (Curtis and Burns 2020); the 2020 price was £2,134.

Clinical input parameters

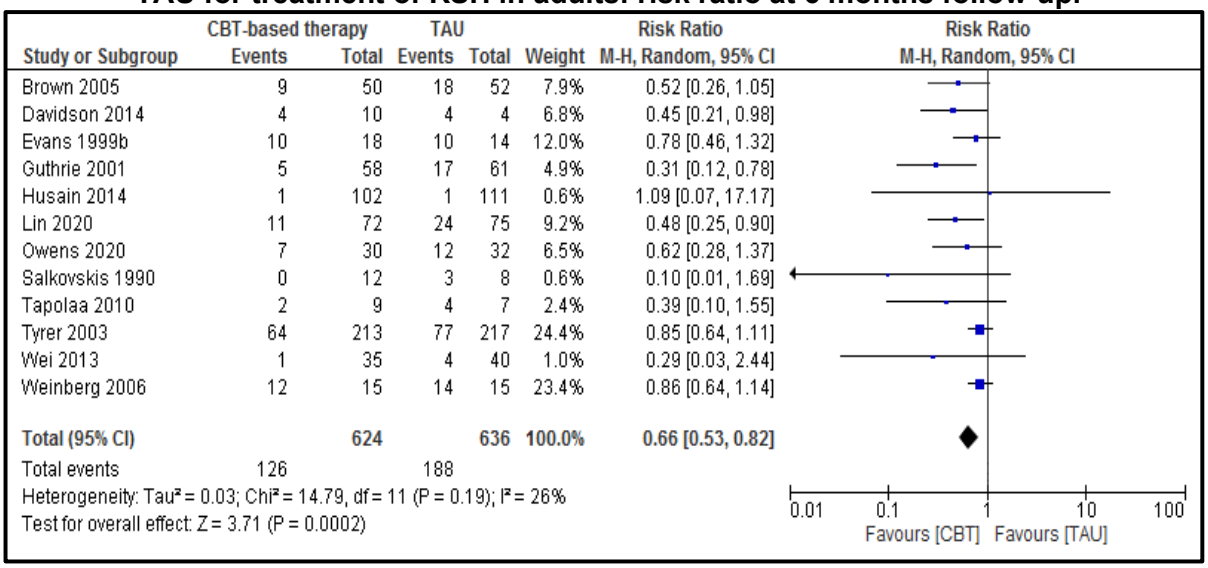
Clinical input parameters consisted of effectiveness data of repetition of self-harm associated with provision of CBT-based psychotherapy in addition to TAU compared with TAU alone; the 6-month risk of RSH in people who did RSH in the previous 6 months, which is the baseline risk of RSH in the model; and the 6-month risk of RSH in people who did not RSH in the previous 6 months.

Effectiveness data

Effectiveness data consisted of the risk ratio (RR) of RSH associated with provision of CBT-informed psychological intervention plus TAU to TAU alone. Data were derived from the Cochrane systematic review and meta-analysis of clinical evidence (Witt 2021a), which included 12 RCTs assessing the effectiveness of CBT-informed psychological intervention plus TAU relative to TAU alone in adults presenting to services following an episode of RSH, at 6 months follow-up.

By the six-month follow-up assessment, there was evidence of an effect for CBT-informed psychological intervention on repetition of self-harm (Odds Ratios [OR]: 0.52, 95% CI 0.38 to 0.70). Using the raw data, we estimated a RR of 0.66 (95% CI 0.53 to 0.82) (Figure 3), which we subsequently combined with the absolute effect of TAU, in order to estimate the absolute effect of CBT-informed psychological intervention plus TAU.

Figure 3: Forest plot for CBT-informed psychological intervention plus TAU *versus* TAU for treatment of RSH in adults: risk ratio at 6 months follow-up.



CBT: cognitive behavioural therapy; CI: confidence interval; M-H: Mantel-Haenszel; TAU: treatment-as-usual.

Other clinical data

The risk of self-harm repetition under TAU in people who had self-harmed within 6 months was estimated using data from Lilley 2008. This UK-based prospective cohort study followed people who attended emergency departments following self-harm (n=7,344 aged 12 years or older) over 18-months and recorded episodes of repeat self-harm. Besides the overall rates of self-harm repetition, the study investigated the differences in repetition rate according to the method of self-harm used on the index episode, and the time from the index episode during the study.

During the study period, 10,498 visits to emergency department because of self-harm were reported. The study provided Kaplan–Meier curves, calculated using recurrent event analysis (where each repeat episode was treated as an index episode). The respective graph provided cumulative proportions of adults repeating self-harm at different time points over time. Using these data, it was possible to estimate the risk of RSH 6 months after the index episode, and also the risk of RSH between 6-12 months from the index episode. Data from the provided graph were extracted using appropriate software (https://www.digitizeit.xyz/).

The risk of repeating self-harm after 6 months from a self-harm episode, as estimated from Lilley 2008, was 0.288; this value was confirmed by the committee to be an accurate approximation of the 6-month risk of RSH in people who have self-harmed under TAU (baseline risk). This risk was used in the model twice: 1) as the baseline risk of RSH for people under TAU in the decision tree component; 2) as the 6-month transition probability in the Markov model component, for people who remain in the RSH state (that is, people who are already in the RSH state in the previous model cycle). The estimated risk of RSH between 6-12 months from the index episode in Lilley 2008 (that is, in people who did not RSH in the first 6 months after the index episode) was used to estimate the 6-month transition probability for people who move to the RSH state from the non-RSH state in the Markov model component; the estimated value was 0.074. This value was also validated by the committee. Based on Lilley 2008, the estimated risk of RSH between 12-18 months from the indext episode was 0.058, suggesting a decrease in the risk over time. This difference in the risk for people who have not self-harmed for at least 6 months (0.074) versus the risk in those who have not self-harmed for at least 12 months (0.058) was considered to be too small to have any impact on the model findings and therefore, for simplicity, it was decided to

use the higher figure of 0.074 for people who have not self-harmed in the last 6 months as a conservative higher estimate.

To sum up, the following 6-month transition probabilities between the RSH and non-RSH health states were used in the Markov model (Lilley 2008):

- 6-month transition probability of moving to the RSH state from the non-RSH state (that is, people who have not RSH in the last 6 months, in the previous model cycle): 0.074
- 6-month transition probability of remaining in the RSH state (that is, people who had RSH in the last 6 months, in the previous model cycle), including the risk of RSH in the first 6 months of the TAU arm: 0.288.

Mortality input parameters

People who have self-harmed have an increased mortality risk relative to the general population. A cohort study that followed individuals of all ages (n=30,950) presenting to emergency departments in the UK after deliberate self-poisoning or self-injury between 2000 and 2007 estimated the increased risk associated with self-harm; this study showed that all-cause mortality following hospital presentation for self-harm was more than twice that expected (Bergen 2012). The increased likelihood of premature death after self-harm (standardised mortality ratio [SMR]) was 4.1 for males and 3.2 for females presented with self-harm relative to that of adults in the general population.

The SMRs of adults presented with RSH relative to adults in the general population was applied onto the most recent general mortality statistics for the population in England (ONS 2020), to estimate the absolute mortality risk in people who self-harmed in the last 6 months (RSH state) relative to those who did not self-harm in the last 6 months (non-RSH state). Adults in the RSH state were assumed to be at increased mortality risk due to RSH only over the time during which they remained in the RSH state. Adults in the non-RSH state were assumed to carry the mortality risk of the general UK population. While in the decision-tree, all adults in the model were assumed to have an increased mortality risk, equal to that of the RSH state, regardless of their response to treatment, given that they were assumed to have self-harmed at model initiation.

Table 16 reports the 6-month mortality risks adopted at each 6-month period of the model.

Table 16: 6-month mortality probabilities for each 6-month model cycle in the study population

Model time-period	Cycle in the Markov model	Age	Risk of death (Men)		Risk of death (Women)	
			People self-harming (RSH state)	General population (non-RSH state)	People self-harming (RSH state)	General population (non-RSH state)
0-6 month[1]	--[1]	29	0.001390	0.000339	0.000482	0.000151
6-12 month	1		0.001390	0.000339	0.000482	0.000151
12-18 month	2	30	0.001474	0.000360	0.000574	0.000180
18-24 month	3		0.001474	0.000360	0.000574	0.000180
24-30 month	4	31	0.001616	0.000394	0.000610	0.000191
30-36 month	5		0.001616	0.000394	0.000610	0.000191
36-42 month	6	32	0.001575	0.000384	0.000691	0.000216
42-48 month	7		0.001575	0.000384	0.000691	0.000216
48-54 month	8	33	0.001800	0.000439	0.000739	0.000231
54-60 month	9		0.001800	0.000439	0.000739	0.000231

1 Decision tree part of the model
RSH: Repeated self-harm

Utility input parameters

In order to express outcomes in the form of QALYs, the health states of the economic model (RSH, non-RSH, death) needed to be linked to appropriate utility scores. Utility scores represent the HRQoL associated with specific health states on a scale usually from 0 (death) to 1 (perfect health); they are estimated using preference-based measures that capture people's preferences on the HRQoL experienced in the health states under consideration.

To estimate QALYs for adults in the non-RSH state, the EQ-5D-derived utility value for adults aged 25-34 years in the general UK population was used (0.93 - Kind 1999). The utility value for adults who RSH was estimated using the EQ-5D-derived utility value reported in a UK study for 754 adolescents who self-harmed (0.68 - Tubeuf 2019). This study was a secondary analysis of a randomised controlled trial comparing family therapy with treatment as usual as an intervention for self-harming adolescents (Cottrel 2018). These EQ-5D-derived utility values were selected due to lack of more relevant data on adults and were presented to the committee when developing the economic model. The committee expressed the view that both values were overestimates of the utility relating to each of the two health states, as they noted that people who have previously self-harmed (even though they have not self-harmed over the previous 6 months) are unlikely to reach the utility value of the general population (0.93 - Kind 1999), and people who have recently self-harmed (in the last 6 months) are unlikely to have a utility as high as 0.68 (Tubeuf 2019)], but noted that the difference in utility values between the two health states of RSH and non-RSH (0.93-0.68=0.25) is probably reflective of changes in HRQoL between these two states, thus confirming the face validity of the differential utility data used in the model, both for adolescents and adults who have self-harmed. Alternative utility data reported in a recent UK economic evaluation were tested in a sensitivity analysis (utility values were 0.67 and 0.54 for non-RSH and RSH health states, respectively) (Quinlivan 2019). The utility of 0.67 reflected the EQ-5D-based utility of 'mental/behavioural problems' or history of 'mental/behavioural disorder' in the UK, while the value of 0.54 reflected the utility of suicide attempt, according to 16 Dutch clinicians; the estimation of this second value does not meet NICE criteria for the estimation of utility values. When observing this evidence, the committee considered this difference in utility between the two health states to be very narrow and unlikely to be reflective of the true difference between the utility in the non-RSH and RSH health states; nevertheless, these data were still tested in sensitivity analysis to explore the impact of a potentially (even though unlikely) small change in HRQoL between the two health states on the results.

Discounting

Discounting at a rate of 3.5% was applied to costs and QALYs that accrued after the first year in the model, as per the NICE reference case (NICE 2020).

Handling uncertainty and presentation of the results

Relative cost effectiveness between CBT-informed psychological intervention plus TAU vs TAU alone was estimated using the incremental cost-effectiveness ratio (ICER). The ICER was calculated using the following formula:

$$ICER = \Delta C / \Delta E$$

where ΔC is the difference in total costs between two treatment options and ΔE the difference in their effectiveness (QALYs). The ICER expresses the extra cost per extra unit of benefit (QALY) associated with one treatment option relative to its comparator. If an option has an ICER of up to £20,000-£30,000/QALY relative to its comparator (NICE lower and upper cost-effectiveness threshold, respectively) then the intervention is considered to be cost-effective (NICE 2013). Estimation of such a ratio allowed consideration of whether the additional benefit was worth the additional cost when choosing one treatment option over another.

Model input parameters were synthesised in a probabilistic analysis. This means that the input parameters were assigned probability distributions (rather than being expressed as point estimates); this approach allowed more comprehensive consideration of the uncertainty characterising the input parameters. Subsequently, 10,000 iterations were performed, each drawing random values out of the distributions fitted onto the model input parameters. Results (mean costs and QALYs for each intervention) were averaged across the 10,000 iterations. This exercise provides more accurate estimates than those derived from a deterministic analysis (which utilises the mean value of each input parameter ignoring any uncertainty around the mean), by capturing the non-linearity characterising the economic model structure (Briggs 2006).

In addition, alternative scenarios were tested in sensitivity analysis. Three categories of sensitivity analyses (SA) were performed: 1) Univariate SAs to assess the sensitivity of the results to variations in single input parameters; 2) Multivariate SAs to assess the sensitivity of the results to variations in combinations of input parameters; and 3) Threshold SAs to assess by how much specific parameter values would need to change, for the conclusions of the analysis to change. In each scenario, probabilistic analysis was conducted (and probability distributions were used for each altered parameter), in order to take uncertainty around mean values into account.

Univariate SA explored the impact of the following input parameters:

- intensity and frequency of the CBT-informed psychological intervention: 1) extending the average number of intended sessions delivered as part of the CBT-informed psychological intervention; 2) varying the average length of each session; 3) assuming a different Band for health professionals delivering the intervention (AfC 7)
- additional healthcare cost associated with self-harm repetition: change of ±50% in the value used in the base-case analysis, as this value reported in Sinclair (2011) had a wide standard deviation around the mean cost estimate
- use of alternative utility weights for the RSH and no RSH health states (utility weights were 0.541 for RSH and 0.671 for no RSH - Quinlivan 2019)

Multivariate SA explored the impact of the following set of input parameters:

- use of alternative utility data (Quinlivan 2019) combined with 8 sessions of CBT-based psychological therapy. The ICER became £27,557/QALY.
- use of alternative utility data (Quinlivan 2019) combined with 10 sessions of CBT-based psychological therapy. The ICER became £46,203/QALY.
- use of alternative utility data (Quinlivan 2019) combined with a 50% reduction in the base-case extra cost associated with self-harm. The ICER became £32,498/QALY.

Finally, each of the following model inputs was tested by means of threshold SA, to explore at which value base-case analysis conclusions would change:

- baseline risk of RSH
- additional healthcare cost of RSH *versus* no RSH
- difference in utility between RSH and no RSH health states

Table 17 provides information on the distributions assigned to input parameters in probabilistic sensitivity analyses.

Results of probabilistic analyses were presented in the form of cost effectiveness acceptability curves (CEACs), which demonstrated the probability of each of the 2 treatment options being the most cost effective at different levels of willingness-to-pay per QALY (that is, at different cost effectiveness thresholds the decision maker may set). Also, the cost effectiveness plane (CEP), which depicts the incremental costs and QALYs of CBT-informed psychological intervention plus TAU *versus* TAU alone (placed at the origin) was used to show the uncertainty around mean cost effectiveness outcomes of the model, represented as

a cloud of points on the plane corresponding to the different 10,000 iterations of the economic model in the probabilistic analysis.

Table 17: Point estimates and probability distributions assigned to input parameters of the guideline economic model.

Input parameter	Point estimate	Probability distribution	Source - Comments
Relative effect			
RR of RSH at 6 months (CBT-informed psychological intervention + TAU *versus* TAU alone)	0.66	Log-normal distribution: 95% CI 0.53 to 0.82	Estimated based on Cochrane systematic review and meta-analysis (Witt 2021a)
Utility weights			
• Base-case analysis			
○ Non-RSH state	0.93	Beta: α= 2025.242; β=152.438	Kind 1999, based on method of moments
○ RSH state	0.68	Beta: α=1529.743; β=719.879	Tubeuf 2019, based on method of moments
• Sensitivity analysis			
○ Non-RSH state	0.671	Beta: α= 4956.723; β=2430.345	Quinlivan 2019, based on method of moments
○ RSH episode state	0.541	Beta: α=1388.935; β=1178.412	
Costs			
Excess cost following RSH *versus* no RSH	£2,134	Gamma: α= 4.00; β= 533.38	Sinclair 2011 – Assumes SE = 0.5*Mean Estimate based on regression analysis. Value is the cost coefficient for people who had self-harmed between 6 months - 1 year ago compared with people who had self-harmed within the last 6 months, inflated to 2020 price.
Number of therapy sessions			
• Base-case analysis			
○ Intended number of sessions: 6	4.725	Attendance rate: 55%: 6; 30%: 3-5; 15%: 1-2	Based on available clinical evidence and committee's expert opinion
• Sensitivity analysis			
○ Intended number of sessions: 8	6.125	Attendance rate: 55%: 8; 30%: 3-7; 15%: 1-2	Based on assumptions and the committee's expert opinion
○ Intended number of sessions: 10	7.525	Attendance rate: 55%: 10; 30%: 3-9; 15%: 1-2	
○ Intended number of sessions: 12	8.925	Attendance rate: 55%: 12; 30%: 3-10; 15%: 1-2	

Input parameter	Point estimate	Probability distribution	Source - Comments
Unit cost of health professional delivering the intervention (mental health nurse)		Normal distribution	Curtis and Burns 2020 - Assumes SE=0.05*Mean For the estimation of unit cost, see Table 14
• Base-case analysis			
○ AfC Band 6	£92	SE = £4.59	
• Sensitivity analysis			
○ AfC Band 5	£76	SE = £3.79	
○ AfC Band 7	£107	SE = £5.36	
○ AfC Band 8a	£123	SE = £6.16	
Transition probabilities			
Transition probability of non-RSH to RSH state	0.074	Beta: α= 781.45; β=9716.55	Lilley 2008; see text for details
Transition probability of RSH to RSH state	0.288	Beta: α=3023.42; β=7474.58	
Other model inputs			
SMRs after self-harm Men	4.10	Log-normal distribution: 95% CI 3.80 to 4.30	Bergen 2012
SMRs after self-harm Women	3.20	Log-normal distribution: 95% CI 2.90 to 3.40	
Gender (% Women)	0.56	Beta: α=3528; β=2816	Cooper 2013, Cooper 2015
Age at start of the model	29	No distribution	

£: pound sterling; AfC: agenda for change; CBT: cognitive behavioural therapy; ICER: incremental cost effectiveness ratio; QALY: quality-adjusted life year; RR: risk ratio; RSH: repeated self-harm; SD: standard deviation; SE: standard error; TAU: treatment-as-usual.

Development and validation of the economic model

Please see for details about the methods followed to develop and validate the economic model 'Development and validation of the economic models'.

Economic modelling results

Base-case analysis

The average total costs from the 10,000 iterations were £2,283 and £2,424 per person for the TAU and CBT-informed psychological intervention plus TAU arms, respectively; the average incremental QALY was 0.02 for the CBT-informed psychological intervention + TAU compared to TAU alone (Table 18). Accordingly, the average ICER was £9,088 per QALY gained, which is well below the lower NICE cost-effectiveness threshold of £20,000/QALY.

Table 18: Probabilistic cost effectiveness estimates for the CBT-based psychotherapy added to TAU compared with TAU at 5-years time horizon

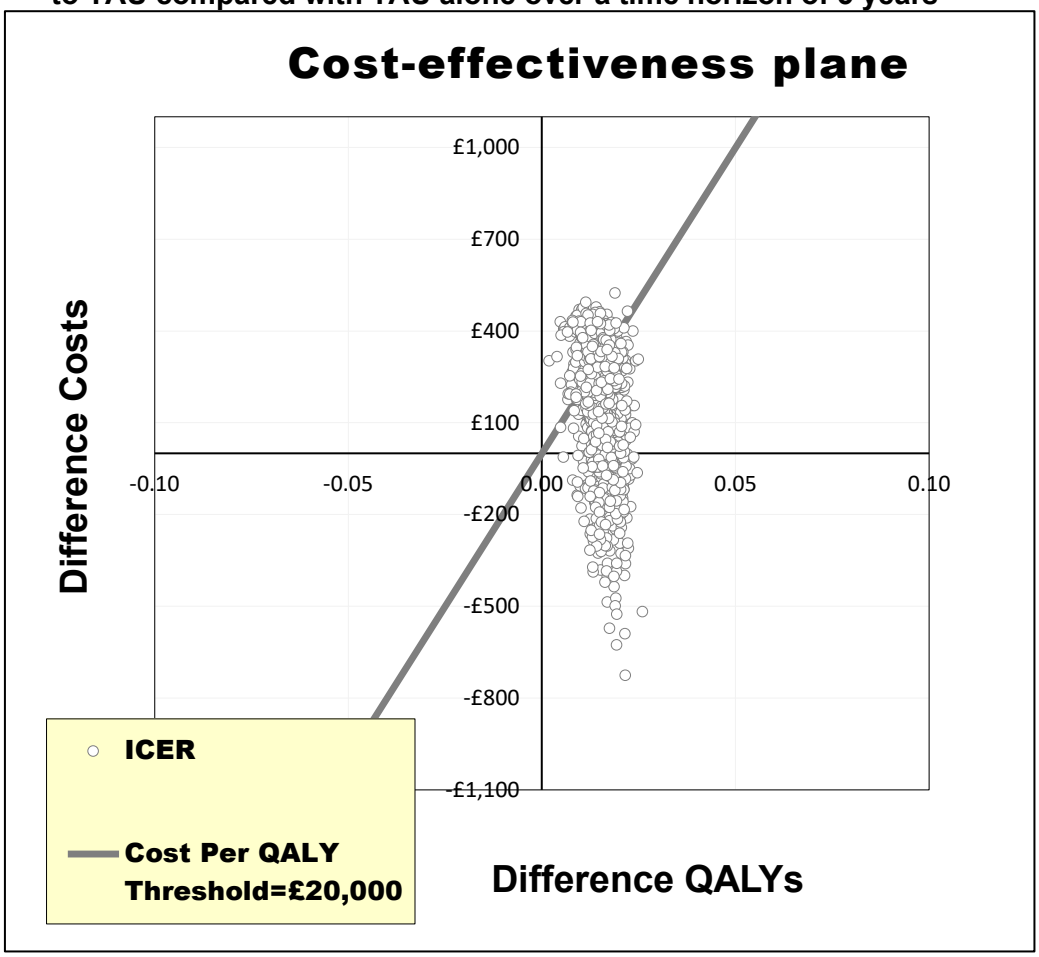
TAU alone	
Costs (£), mean – *SD*	£ 2,283 – *1,169*
QALY, mean – *SD*	4.14 – *0.02*
TAU + CBT-informed psychological intervention	
Costs (£), mean – *SD*	£ 2,424 – *1,048*
QALY, mean – *SD*	4.15 – *0.02*
TAU + CBT-informed psychological intervention *versus* TAU alone	

	Incremental cost, mean – *SD*	£ 141 – *206*
	Incremental QALY, mean – *SD*	0.02 – *0.00*
	ICER (£/QALY)	£ 9,088[1]

£: pound sterling; CBT: cognitive behavioural therapy; ICER: incremental cost effectiveness ratio; QALY: quality-adjusted life year; SD: standard deviation; TAU: treatment-as-usual.
1 Average probabilistic cost-efffetiveness estimated results

Figure 4 shows the cost effectiveness plane for the CBT-informed psychological intervention compared with TAU at 5-years based on 10,000 iterations. The diagonal line represents the willingness to pay per QALY threshold of £20,000. All the simulation estimates are on the right of the y-axis, showing that the CBT-informed psychological intervention is always more effective than TAU. Most of the ICERs are in the north-east quadrant (75% of the 10,000 iterations), where the CBT-informed psychological intervention results in higher costs compared with TAU. Of these, 51% are below the line showing the NICE threshold of £20,000 per QALY gained. In addition, the remaining estimates are in the south-east quadrant (25% of the 10,000 iterations), showing that, in those iterations, the CBT-informed psychological intervention + TAU led to lower costs compared with TAU alone; in these iterations the CBT-informed psychological intervention + TAU is dominant (this is, the intervention is both clinically superior and cost saving compared to the TAU). Overall, results suggest that the CBT-based psychotherapy added to TAU is likely to be cost effective compared to TAU alone, with a probability of 51% + 25% = 76%.

Figure 4: Cost effectiveness plane of CBT-informed psychological intervention added to TAU compared with TAU alone over a time horizon of 5 years

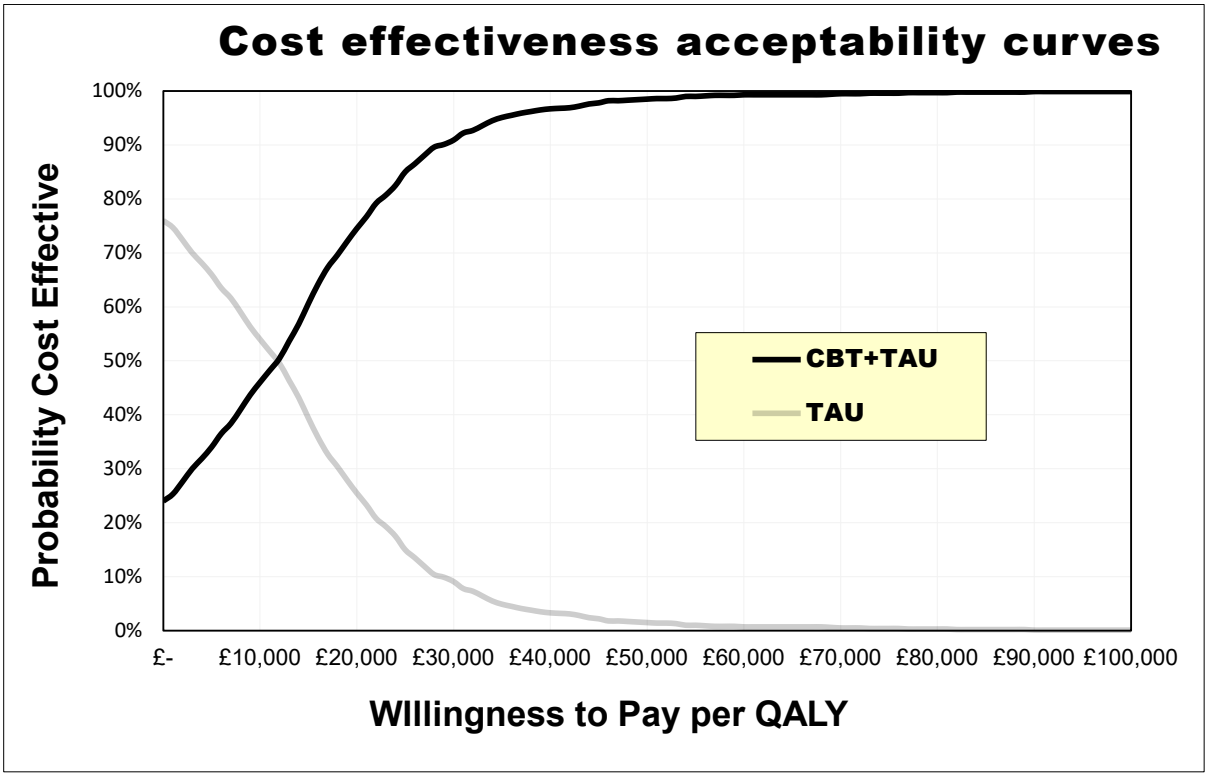


£: pound sterling; ICER: incremental cost effectiveness ratio; QALY: quality-adjusted life year

A cost effectiveness acceptability curve of the CBT-informed psychological intervention compared with TAU alone is presented in Figure 5. At a threshold of £20,000, the CBT-

informed psychological intervention + TAU had a 76% chance of being cost effective, and this percentage increased to 92% when the threshold was £30,000. There is a positive relationship between the cost effectiveness threshold and the chance of CBT-informed psychological intervention being cost effective, and this is because the CBT-informed psychological intervention was, on average, more effective (in terms of QALY gains) than TAU, while either being cost saving or costing slightly more.

Figure 5: Cost effectiveness acceptability curves for the CBT-informed psychological intervention added to TAU compared with TAU alone over a 5 years' time horizon



£: pound sterling; CBT: cognitive behavioural therapy-informed psychological intervention; ICER: incremental cost effectiveness ratio; QALY: quality-adjusted life year; TAU: treatment-as-usual.

Sensitivity analysis

To account for uncertainty in the incremental costs and QALYs estimation, a number of probabilistic univariate sensitivity analyses were conducted (Table 19). The first sensitivity analyses included making different assumptions about the delivery of the CBT-informed psychological intervention: 1) varying the average number of sessions delivered, as defined earlier in the methods (section 'Handling uncertainty and presentation of the results'); 2) Varying the average length of each CBT-informed psychological intervention from 50 to 65 minutes; 3) Assuming different healthcare professional's salaries; 4) using alternative utility data from Quinlivan 2019. By exploring these model's assumptions, the delivery of the CBT-informed psychological intervention remained likely to be cost effective in adults who RSH at 5 years time horizon in all but one cases; it was unlikely to be cost effective when it was provided in more than 10 sessions (Table 19). As for the base-case analyses, these results indicate the CBT-informed psychological intervention plus TAU is more effective than the TAU alone, and so, as the value placed on a QALY increases, the likelihood that the intervention is cost-effective rises.

Table 19: Probabilistic cost effectiveness estimates for the CBT-informed psychological intervention added to TAU compared with TAU alone – Univariate sensitivity analysis

CBT-informed psychological intervention + TAU *versus* TAU – Assumptions		ICER[1] (£/QALY)	Probability of being cost effective at a threshold of:	
			£20,000 /QALY	£30,000 /QALY
Base-case analysis	**-**	**£9,088**	**76 %**	**92 %**
Assuming a different average number of sessions delivered as part of the CBT-informed psychological intervention	8	£15,957	52 %	73 %
	10	£24,131*	36 %	53 %
	12	£32,404*	30 %	40 %
Assuming a different average length of each CBT-informed psychological intervention session	50 minutes	£5,884	84 %	96 %
	60 minutes	£9,760	73 %	90 %
	65 minutes	£12,474	63 %	86 %
Assuming a different health professional's salary band	AfC 5	£4,567	87 %	98 %
	AfC 7	£13,484	62 %	83 %
	AfC 8a	£17,856	49 %	73 %
Change in the excess NHS cost associated with RSH relative to no RSH	+ 50%[2]	£302	87 %	96 %
	- 50%[3]	£16,525	57 %	85 %
Alternative utility data (Quinlivan 2019)	RSH: 0.541; noRSH: 0.671	£ 16,023	50 %	64 %

£: pound sterling; AfC: agenda for change; CBT: cognitive behavioural therapy; ICER: incremental cost effectiveness ratio; QALY: quality-adjusted life year; RSH: repeated self-harm; TAU: treatment-as-usual.
** non cost effective results at the NICE lower cost-effectiveness threshold of £20,000/QALY*
1 Average probabilistic cost-effectiveness estimated results
2 £3,200
3 £1,067

Besides univariate sensitivity analyses, multivariate sensitivity analyses were conducted to study the effect of using alternative utility weights combined 1) with an increase in the number of CBT-informed psychological intervention sessions and 2) with a 50% reduction in the excess NHS cost of RSH relative to RSH, on the results of the economic model (Table 20). In none of these scenarios was CBT-informed psychological intervention found to be cost effective, using the NICE lower cost-effectiveness threshold of £20,000/QALY (Table 20).

Table 20: Probabilistic cost effectiveness estimates for the CBT-informed psychological intervention added to TAU compared with TAU alone – Multivariate sensitivity analysis

CBT-informed psychological intervention + TAU *versus* TAU – Scenarios explored	ICER[1] (£/QALY)	Probability of being cost effective at a threshold of:	
		£20,000 /QALY	£30,000 /QALY
Base case analysis	**£ 9,088**	**76%**	**92%**
Alternative utility data (Quinlivan 2019) combined with 8 sessions of CBT-based psychological therapy	**£27,557**	**34%**	**47%**
Alternative utility data (Quinlivan 2019) combined with 10 sessions of CBT-based psychological therapy	**£46,203**	**27%**	**31%**

CBT-informed psychological intervention + TAU *versus* TAU – Scenarios explored	ICER[1] (£/QALY)	Probability of being cost effective at a threshold of:	
		£20,000 /QALY	£30,000 /QALY
Alternative utility data (Quinlivan 2019) combined with a 50% reduction in the excess NHS cost associated with RSH relative to no RSH	**£32,498**	**28%**	**40%**

£: pound sterling; CBT: cognitive behavioural therapy; ICER: incremental cost effectiveness ratio; QALY: quality-adjusted life year; RSH: repeated self-harm; TAU: treatment-as-usual.
1 Average probabilistic cost-efffetiveness estimated results
** non cost effective results at the NICE lower cost-effectiveness threshold of £20,000/QALY*

Finally, as suggested by the findings of the threshold sensitivity analysis (Table 21), compared to TAU alone, CBT-informed psychological intervention plus TAU will remain cost effective if: 1) the baseline risk of RSH in the model population would be at least 21.5% (in the base-case analysis this value is 28.8 %); or the excess cost of RSH vs no RSH state would be at least £588 (instead of £2,133.53 with the base-case scenario); or the difference in utility between RSH and non-RSH state would be at least 0.10 (in base-case analysis this difference is 0.25)

Table 21: Cost effectiveness estimates for the CBT-informed psychological intervention added to TAU compared with TAU alone – Threshold sensitivity analysis

CBT-informed psychological intervention + TAU *versus* TAU – Input parameters	Base-case value	Threshold value for the intervention to remain cost-effective[1]	
		Absolute target value	% Change[2]
Baseline risk of RSH	0.288	0.215	- 25%
Additional healthcare cost of RSH *versus* no RSH	£2,134	£ 588	- 72%
Difference in utility between RSH and no RSH health states	0.25	0.10	- 60%

1 £20,000/QALY
2 relative to the base-case value
£: pound sterling; CBT: cognitive behavioural therapy; ICER: incremental cost effectiveness ratio; RSH: repeated self-harm; TAU: treatment as usual.

Discussion

The primary purpose of this economic model was to assess the relative cost-effectiveness of CBT-informed psychological intervention in addition to TAU *versus* TAU alone for adults who RSH. When considering a population of adults who RSH, our results suggest that the ICER for CBT-informed psychological intervention added to TAU was below the NICE threshold of £20,000 per QALY over 5 years. Secondly, starting with our base case economic scenario, we aimed to simulate costs and effectiveness data exploring a number of scenarios different from the base case; such as the intensive delivery of the CBT-informed psychological intervention, or considering the most relevant model's assumptions (for example, NHS cost parameters, clinical input parameters, and QALY valuation). By exploring all these model's assumptions, the delivery of the CBT-based psychotherapy remained likely to be cost effective in adults who RHS, suggesting confidence around both models' results when model assumptions varied. The committee pointed all the above considerations out, when discussing the evidence and drafting the recommendations for this area of the guideline.

None of the analyses identified in the economic evidence review were focused on CBT-informed psychological intervention for people who RSH, except Byford (2003). In this cost-utility analysis, which assessed the cost-effectiveness of manual-assisted cognitive behaviour therapy (MACT) relatively to TAU, MACT was found to be cheaper but slightly less effective than TAU, and, overall, more cost-effective than TAU. The results of this study are highly applicable to this guideline in terms of the population, healthcare system, interventions and outcomes considered (Byford 2003). However, this study was considered to have potentially serious methodological limitations: the short-term time horizon, which was 12 months follow-up (Tyrer 2003); in addition, the baseline and the relative intervention effects data were based on a single RCT (Tyrer 2003).

Therefore, the present analysis makes an important contribution to the existing evidence on the cost effectiveness of CBT-informed psychological intervention(s) in people who RSH. It shows the cost-effectiveness CBT-informed psychological intervention added onto TAU compared to the TAU alone in the UK, using incremental costs per QALY gained as the primary outcome measure, adopting a longer-term analytical time horizon; and obtaining effectiveness data from the Cochrane review and meta-analysis of clinical evidence, which informed the guideline.

The model's results should be interpreted in light of the information on the probabilities of repeating self-harm, since such data were based on a single, albeit large, study (Lilley 2008). This was a prospective multicentre cohort analysis involving 10,498 consecutive episodes of self-harm at six English teaching hospitals, and its estimates of RSH are supported by alternative sources of evidence (such as Cooper 2015). The figures reported in Lilley 2008 were estimated from Kaplan–Meier curves which used recurrent event analysis (that is each repeat episode of self-harm treated as an index episode): the risk at 0-6 months was used to estimate the 6-month risk of remaining in the RSH state (that is, the 6-month risk of RSH in people who had self-harmed within the last 6 months); the risk at 6-12 months of the study was used to estimate the 6-month risk of moving to the RSH state from the non-RSH state (that is, the 6-month risk of RSH in people who had not self-harmed in the last 6 months). During the discussion of this evidence, the committee confirmed the face validity of these data, so, they agreed for these data to be used in the economic model.

The findings of the present model may be restricted by the paucity of self-harm related utility data. In the economic model, 2 different sets of utility data were used to reflect the health-related quality of life associated with RSH and no RSH. The first set of utility data (No RSH: 0.93 and RSH: 0.68; Kind 1999 and Tubeuf 2019 respectively) were considered by the committee to reflect the difference in utility between the two health states, although each value appeared to be an overestimate of the HRQoL in the respective health state. It is noted that this set of data has also been used in the base-case economic analysis described in McDaid 2022, who estimated the cost-effectiveness of psychosocial assessment for individuals who present to hospital following self-harm in England. The second set of utility data does not meet NICE criteria for the estimation of utility values; in addition, the committee considered the difference in utility between the two health states too narrow (RSH: 0.54 and No RSH: 0.67 - Quinlivan 2019). Nevertheless, no alternative utility data were available, and therefore, after considering the available data, the committee advised that the first set of utility values be used in the base-case analysis, and the second set of utility data (Quinlivan 2019) be investigated in sensitivity analysis.

Self-harm is strongly associated with mental health problems, and related utility values reflect the overall HRQoL of people experiencing/living with self-harm and other mental health problems, as it is not possible to isolate and represent separately HRQoL relating to self-harm and HRQoL relating to another mental-health problem. Similarly, people who have not self-harmed in the last 6 months (no RSH state), are expected to experience improvement in both their self-harming behaviour and associated mental health problems, and their HRQoL consequently reflects both improvements (as, again, it is not possible to isolate these from

one another). Therefore, the utility values used in the model are assumed to reflect HRQoL related to self-harm that incorporates mental health problems or related improvements.

It is noted that the utility value of the no RSH state used in the base-case analysis is that of the general population in the UK, suggesting that the intervention has had a positive impact on other mental health problems. In sensitivity analysis, the utility value of the no RSH state reflects 'mental/behavioural problem or history of mental disorder'. This is non-specific to the no RSH state and may also include improvement in other mental health problems (since it also incorporates the value of 'history' of a mental disorder). Therefore, the utility values of the no RSH state used both in base-case and sensitivity analysis reflect wider mental health improvements associated with this state, and not only improvements in self-harming behaviour.

Overall conclusions from the guideline economic analysis

The results of the guideline economic analysis suggest that individual CBT-informed psychological intervention is likely to be cost-effective in the treatment of adults who have RSH. When discussing the economic evidence, the committee acknowledged that these findings needed to be interpreted with some caution due to the limited evidence base characterising some of the models' input parameters. Based on the findings of the economic model and supplemented by the results of the clinical review, the committee pointed out the vital role played by CBT-informed psychological intervention in the management of self-harm recurrence in adults, while ensuring NHS resources are used efficiently.

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DBT-A for children and young people who have self-harmed

Objective of economic modelling

Economic modelling methods

The Cochrane systematic review of clinical evidence (Witt 2021b) demonstrated that dialectical behavioural therapy adapted for adolescents (DBT-A) who repeated self-harm (RSH) is effective in reducing the repetition of self-harm episodes when compared with treatment as usual (TAU) or another comparator; in addition, the existing clinical evidence was deemed as adequate to inform exploratory bespoke economic modelling. Based on these considerations, an economic model was developed to assess the relative cost-effectiveness of DBT-A *versus* enhanced TAU for children and young people who have self-harmed in the UK.

Population

The study population of the economic model comprised children and young people (CYP) with a hospital presentation for self-harming in the prior six months; furthermore, young people included in the economic model may have repeated single or multiple self-harm episodes in the past. The age of the population at the start of the model was 16 years, in accordance with a large UK-based prospective cohort study; 75% of the model's population were women (Hawton 2012). The starting age of the cohort and its gender composition were needed in order to estimate mortality risks in the cohort over the time horizon of the economic analysis.

Intervention

The economic analysis considered DBT-A as this was the only intervention that was shown to be effective in reducing the number of future RSH episodes according to the Cochrane systematic review and meta-analysis of the clinical evidence (Witt 2021b). The characteristics of DBT-A in terms of effectiveness and resource use (healthcare professional time, and number of sessions delivered), were determined by the findings of the Cochrane systematic review and meta-analysis that informed the review question, supplemented by the committee's expert opinion (Witt 2021b).

The comparator of the meta-analysis was 'TAU or another comparator'. After reviewing the comparators in the studies included in the Cochrane meta-analysis that informed the guideline economic model, and following the committee's expert advice, it was agreed that the comparator was equivalent, on average, to enhanced TAU. According to the committee's expert opinion, enhanced TAU is expected to be diverse and delivered by a range of providers. In order to model the costs and outcomes of enhanced TAU, we considered enhanced TAU described in a clinical trial conducted in the UK (Cottrell 2018) as treatment provided by children and adolescent mental health services (CAMHS) to children and young people who RSH after initial hospital management.

Scope of the economic model

The economic analysis adopted the perspective of the NHS and personal social services (PSS), as recommended by NICE (NICE 2020). The measure of outcome was the Quality Adjusted Life Year (QALY), which incorporated utilities associated with repetition of self-harm health-related quality of life (HRQoL). Costs to the NHS & PSS consisted of DBT-A and enhanced TAU-based intervention costs (healthcare professional time and number of sessions delivered as part of intervention) and use of health and social care services (including GP care, CAMHS, other primary care, hospital inpatient and outpatient care, emergency department presentations, physiotherapy, occupational therapy and social care) by children and young people who have self-harmed. The cost year was 2020.

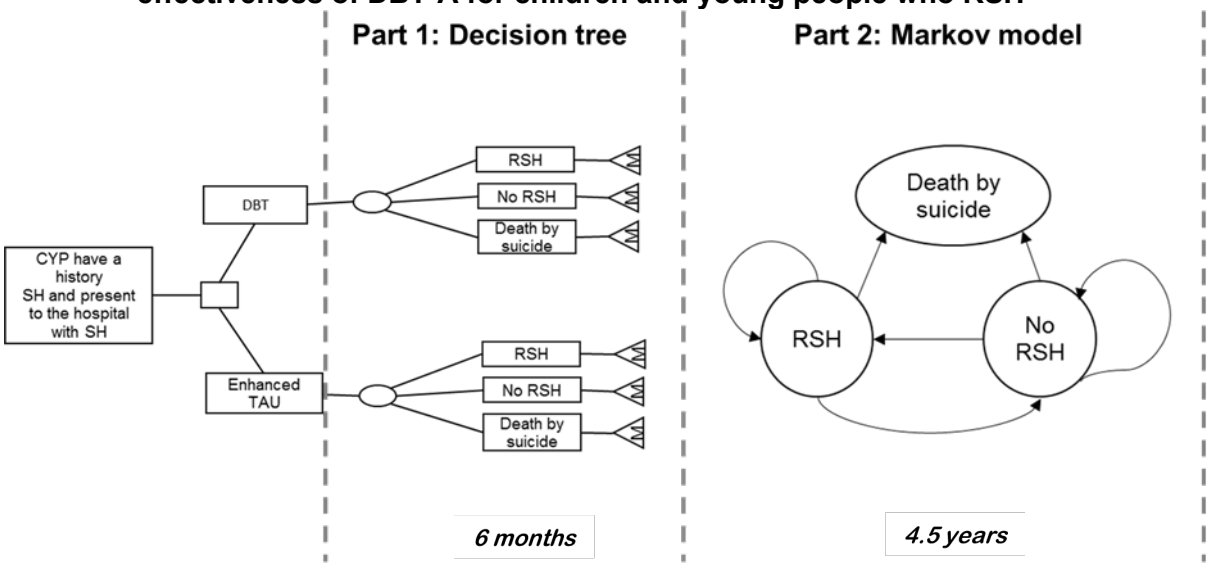
Model structure

Figure 6 presents a schematic diagram of the hybrid decision-analytic model developed using Microsoft Office Excel 2013; it consisted of a simple decision tree lasting 6 months incorporating Markov nodes (represented by 'M' in Figure 2– Part 1), and a Markov simulation model involving 3 health states (RSH, no RSH and death due to suicide), which lasted 4.5 years with a 6-month cycle Figure 2 – Part 2). A 6-month cycle was used based on data availability and GC advice that this is an appropriate period over which to model RSH events. A half-cycle correction was applied.

The structure of the model, which aimed to simulate the natural history of the CYP self-harming population, was driven by patterns of clinical practice in the UK and the availability of relevant data sources (see section 'Development and validation of the economic model' for further details). The model estimated the total costs and effects associated with the provision of DBT-A and enhanced TAU for CYP who RSH. According to the model structure, hypothetical cohorts of CYP who RSH were either initiated on DBT-A or received enhanced TAU. Following care received, CYP either RSH, did not RSH or died by suicide, with 'death' taken as the absorbing state (Figure 6). Due to lack of long-term comparative clinical data, transitions between the 'RSH' and 'no RSH' health states in the Markov component of the model were assumed to be independent of the intervention received at the decision-tree part of the model. The transition probability to the death by suicide state depended on the RSH status of each young person in the population.

The time horizon of the analysis was 5 years. This time frame was considered to be long enough to capture longer-term costs and effects of treatment, without significant extrapolation over the course of RSH.

Figure 6: Schematic structure of the economic model assessing the cost-effectiveness of DBT-A for children and young people who RSH



DBT-A: Dialectical behaviour therapy adapted for adolescents; RSH: repeated self-harm; SH: self-harm; TAU: Treatment as usual

Cost input parameters

Dialectical behaviour therapy costs

The intervention cost of DBT-A was estimated by combining resource use associated with provision of DBT-A with appropriate unit costs. It was assumed that DBT-A was a modular psychological treatment consisting of a combination of individual psychotherapy, group skills training, therapist consultation team, and telephone counselling. In our model, the DBT-A

delivery mode consisted of 16 weekly sessions (60 minutes) of individual therapy, 16 weekly sessions (120 minutes) of skills training in a group format (2 therapists and 10 participants per group), 16 weekly sessions (120 minutes) of therapist consult team and out-of-hours counselling over the telephone as needed. Such assumptions on the DBT-A delivery mode were based on routine practice in the UK (according the advice of the committee) and the reported number and duration of sessions across studies informing the Cochrane review and meta-analysis of clinical evidence (Witt 2021b). Based on this evidence and on the committee's advice on patterns of attendance of CYP to DBT-A's individual psychotherapy sessions in the UK, we assumed the proportions of CYP attending DBT-A individual psychotherapy as reported in Table 22. By weighing the intended number of individual psychotherapy sessions with their likely attendance rates we obtained the average number of attended DBT-A's individual psychotherapy sessions in the model, which is 13.875 (this is the mean number of sessions likely to be provided based on the attendance rates of service users). This number was used in order to estimate the mean individual intervention cost. The number of therapist sessions per person attending group sessions was not altered from the intended number of 16 sessions, because the number of group sessions remains the same, whether a participant attends the full course of treatment or a lower number of sessions.

Table 22: People attending individual DBT-A sessions[1]

Number of sessions (intended)	Attendance rate
16 sessions	75 %
5-15 sessions	8.33 % (1/3 of non-completers, that is, of 25%)
1-4 sessions	16.67 % (2/3 of non-completers, that is, of 25%)

1 The mean number of individual DBT-A sessions is estimated, based on the attendance rates of service users and the distribution in the number of individual DBT-A sessions attended, at 13.875 = 16 x 75% + 10 x 8.33 % + 2.5 x 16.67%
DBT-A: Dialectical behaviour therapy adapted for adolescents

According to the advice of the guideline committee, 4 main assumptions were made to estimate the unit cost of a health professional delivering DBT-A:

- A Band 7 salary pay scale was used to estimate unit cost per hour of the therapist delivering each session; unit costs of scientific and professional staff were used (Table 23)
- The direct to indirect time of professionals delivering DBT-A based on published estimates (Curtis and Burns 2020) was considered when estimating unit costs of professionals involved in delivering DBT-A (Table 23)
- 2/3 of staff delivering DBT-A were assumed to be mental health nurses and 1/3 clinical psychologists; this assumption was used in order to estimate qualification costs
- An additional training in DBT-A was estimated to cost £ 9,463, equal to a post-graduate diploma in DBT, as agreed with the committee

Table 23: Unit cost of health professional staff delivering DBT-A, AfC band 7 (2020 price)

Cost element	Unit cost (annual)	Source
Wages – salary	£ 41,226	Curtis and Burns 2020; unit cost of Scientific and professional staff, (AfC band 7)
Salary on-costs	£ 13,024	
Overheads – staff	£ 13,291	
Overheads - non-staff	£ 20,723	
Capital overheads	£ 5,237	
Qualifications[1]	£ 11,794	Curtis and Burns 2020, 'Training costs of health and social care professionals', nurses: - £8,744 per annum; accounting for

Cost element	Unit cost (annual)	Source
		2/3 of health professionals delivering the intervention Clinical psychologist qualification cost: £166,493 in 2020 prices (NHS England and Health Education England 2016) or £15,438 per annum, annuitised assuming 42 years up to retirement and 23 years of useful working life, using the formula in Netten 1998; accounting for 1/3 of health professionals delivering the intervention Training cost in DBT: £173 per annum. Based on available postgraduate programmes in DBT of £9,463 (one-off cost based on MSc in Oxford/Bangor 2020), annuitized assuming 42 years up to retirement and 23 years of useful working life, using the formula in Netten 1998
SUM of unit costs	£ 105,257	
Working time	42.6 weeks (1,599 hours) per year, 37.5 hours per week	Curtis and Burns 2020
Total cost per hour	£ 65.83	
Ratio of direct to indirect time[1]	1-to-0.91	Assumption based on the committee's expert opinion
Estimated cost per hour of direct contact	£ 138.16	

AfC: Agenda for Change; DBT-A: Dialectical behaviour therapy adapted for adolescents
1 ratio of face-to-face time to time for preparation and other administrative tasks

Therapist consult team sessions and telephone counselling were not costed, as they were delivered by healthcare professionals already involved in delivering individual psychotherapy and group skills training sessions, with no additional use of their time (these components are included in the professionals' direct-to indirect time ratio of contact with patients). After combining resource use with unit costs estimated as described above, the mean cost per CYP receiving the DBT-A intervention was estimated to be £2,801 (Table 24).

Table 24: DBT-A delivery mode and total cost

DTA-A component	Resource use	Cost
Individual psychotherapy	13.875[1] individual sessions x 60 minutes each, deliverd by a band 7 health professional at a unit cost of £138.16 per hour of direct contact[2]	£1,917
Group skills training	16 group sessions x 120 minutes each, delivered to 10 participants by 2 band 7 health professionals at a unit cost of £138.16 per hour of direct contact[2]	£884
Total cost		£2,801

1 See Table 22
2 See Table 23
DBT-A: Dialectical behaviour therapy adapted for adolescents

Enhanced treatment as usual costs

Based on the committee's advice, enhanced TAU for CYP who have self-harmed in the UK was assumed to be in line with the treatment as usual reported in a multicentre RCT and

economic analysis conducted in the UK (Cottrell 2018). This study assessed the effectiveness and cost-effectiveness of family therapy (FT) compared with TAU across 3 English regions. Therefore, enhanced TAU consisted of the care offered to CYP referred to children and adolescent mental health services (CAMHS) following self-harm, and included CAMHS services, telephone contacts and therapist's supervision. Cottrell (2018) reports a cost of TAU in the UK of £ 875 at 6 months follow-up, in 2014 prices (Table 25) . This estimate was inflated to 2020 price year using the NHS Cost Inflation Index after that and up to 2020 (Curtis and Burns 2020); the 2020 price was £ 961.

Table 25: Average enhanced TAU cost at 6 moths follow-up (Cottrell 2018; 2014 prices)

Cost category	Point estimate	Standard error
CAMHS services	£ 800.73	71.7
Telephone contact	£ 56.05	11.15
Therapist's supervision	£ 18.50	2.38
Total	**£ 875.28**	**-**

CAMHS: children and adolescent mental health services; TAU: Treatment as usual

Healthcare costs associated with self-harm

The estimation of healthcare costs associated with the RSH and non-RSH health states incurred by CYP who had self-harmed in the past was based on the economic analysis published by Cottrell (2018). This study estimated health and social care costs following an episode of self-harm from the perspective of the NHS and PSS. This UK study comprised a cohort of adolescents aged 11 to 17 years who self-harmed prior to assessment by the CAMHS team (n=832). Resources measured in the study included health community and social care services, hospital services, and medication use. Besides baseline, resource use data were collected at 6, 12 and 18 months converted into costs using unit cost figures from the British National Formulary (BNF), Personal Social Services Research Unit (PSSRU) and the Department of Health's National Schedule of Reference Costs (Cottrell 2018). The costing results were reported 2014/2015 prices in terms of healthcare costs associated with RSH within the previous 6 months and healthcare costs associated with no RSH within the previous 6 months (Table 26). These estimates were inflated to 2020 price year using the NHS Cost Inflation Index after that and up to 2020 (Curtis and Burns 2020); the resulting costs associated with using healthcare services were £1,859 for CYP who RHS and £807 for CYP who did no-RHS within the last 6 months.

Table 26: Average 6-month healthcare cost associated with self-harm (Cottrell 2018)

Study time period		Healthcare cost of RSH	Healthcare cost of no RSH
0-6 months	TAU arm	£ 1,182	-
	FT arm	£ 1,049	-
7-12 months	TAU arm	£ 1,698	£ 709
	FT arm	£ 2,186	£ 763
13-18 months	TAU arm	£ 1,510	£ 817
	FT arm	£ 2,530	£ 649
Average 6-month cost (2014 prices)		£1,693	£735
Average 6-month cost (uplifted to 2020 prices)		**£1,859**	**£807**

FT: family therapy; RSH: repeat self-harm; TAU: treatment as usual

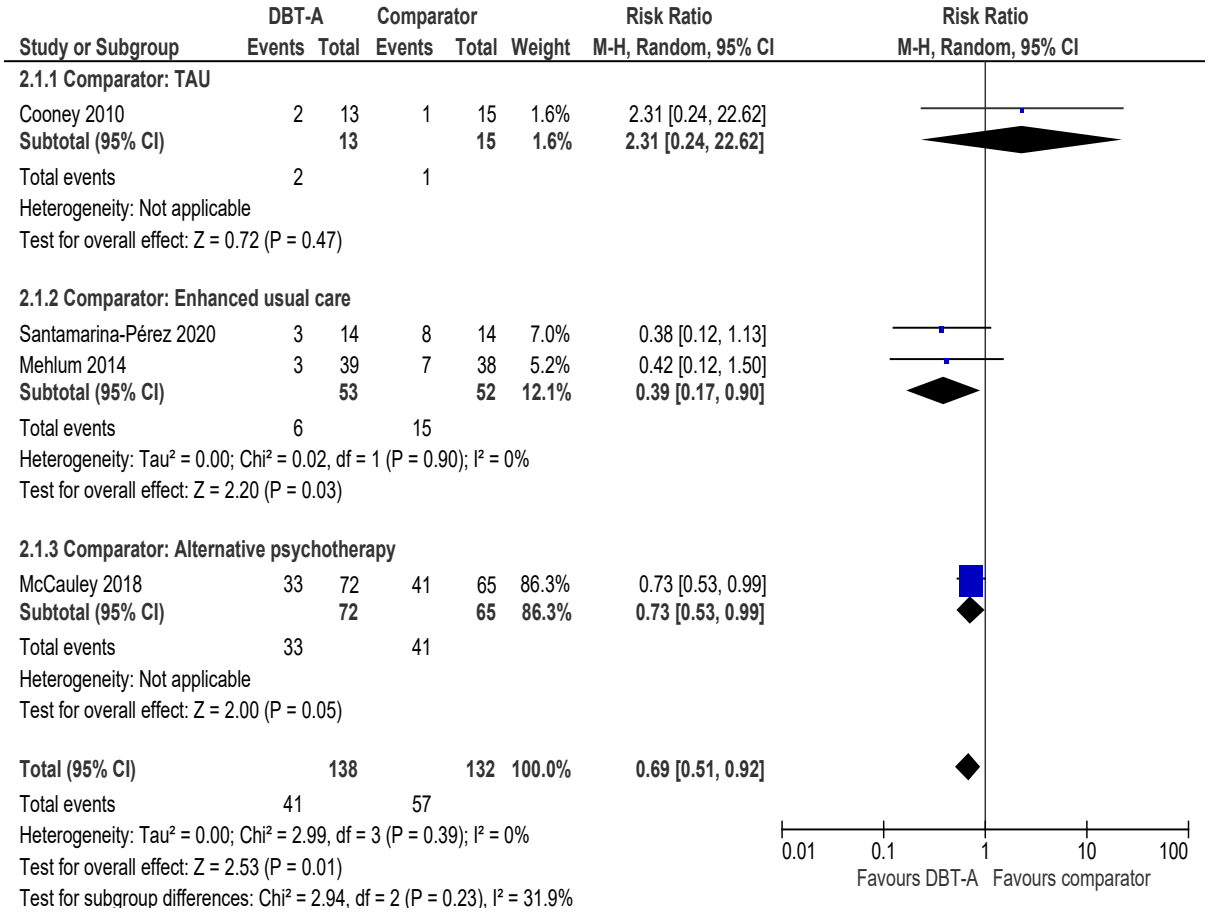
Clinical input parameters

Effectiveness data

Effectiveness data consisted of the risk ratio (RR) of RSH associated with provision of DBT-A to TAU or other comparator. Data were derived from the Cochrane systematic review and meta-analysis of clinical evidence, which included 4 RCTs (Cooney 2010, McCauley 2018, Mehlum 2014, and Santamarina-Pérez 2020) assessing the effectiveness of DBT-A relative to TAU in CYP presenting to services following an episode of RSH, at 6 months follow-up (Witt 2021b). As reported in the Cochrane review of clinical evidence, the evidence was deemed to be of high certainty, and there was no evidence of a difference by comparator (TAU *versus* enhanced TAU *versus* alternative psychotherapy), even though there were some concerns with regards to the overall risk of bias for all four trials (Witt 2021b).

By the six-month follow-up assessment, there was evidence of an effect for DBT-A on repetition of self-harm (Odds Ratios [OR]: 0.46, 95% CI 0.26 to 0.82). Using the raw data, we estimated a RR of 0.69 (95% CI 0.51 to 0.92) (Figure 7), which we subsequently combined with the absolute effect of enhanced TAU, in order to estimate the absolute effect of DBT-A.

Figure 7: Forest plot for DBT-A *versus* enhanced TAU for treatment of RSH in CYP: risk ratio at 6 months follow-up.



DBT-A: Dialectical behaviour therapy adapted for adolescents; CYP: Children and young people; RSH: repeated self-harm; SH: self-harm; TAU: Treatment as usual

Other clinical data

The baseline risk and the transition probabilities of self-harm repetition in CYP used in the model were estimated using data from Cottrell 2018. This UK-based randomised controlled trial aimed to assess the effectiveness and cost-effectiveness of family therapy (FT)

compared with treatment as usual (TAU) in adolescents aged 11 to 17 years who self-harmed prior to assessment by the CAMHS team (n=832) during the 18-month study period. Table 27 summaries the risks that have been used in the Markov model as transition probabilities between the RSH and the non-RSH states for the hypothetical cohort of CYP in a cycle time, plus the baseline probability of RSH in children and young people used in the decision tree part of the model (Cottrell 2018).

Table 27: Baseline risk of RSH and 6-month transition probabilities of self-harm repetition in CYP (based on Cottrell 2018)

6-month probabilities	Point estimate
Baseline risk of RSH for CYP receiving enhanced TAU	0.142
Probability of RSH in CYP who had not RSH in the previous 6 months	0.076
Probability of RSH for CYP who had RSH in the previous 6 months	0.256

CYP: Children and young people; RSH: Repeated self-harm; TAU: Treatment as usual

Mortality input parameters

Children and young people (CYP) who have repeated self-harm have an increased mortality risk due to suicide relative to the general population. A prospective cohort study followed children and young people aged 10-18 years presenting to emergency departments in the UK after non-fatal self-harm between 2000 and 2013 (n=9173 individuals who had 13,175 presentations for self-harm), to estimate the increased risk of suicide associated with self-harm. This study showed that in CYP the increased likelihood of premature death by suicide after self-harm was more than 30 times higher (standardised mortality ratio: 31.0, 95% CI 15.5 to 61.9) relative to that of CYP in the general population (Hawton 2020).

Table 28 reports the 6-month mortality risks adopted at each 6-month period of the model. The standardised mortality ratios (SMRs) of CYP presented with RSH relative to CYP in the general population was applied onto the most recent age-specific suicide rate statistics for the population in England (ONS 2020), to estimate the absolute mortality risk due to suicide in CYP who self-harmed in the last 6 months (RSH state) relative to those who did not self-harm in the last 6 months (non-RSH state). CYP in the RSH state were assumed to be at increased mortality risk due to RSH only over the time during which they remained in the RSH state. CYP in the non-RSH state were assumed to carry the mortality risk of the general UK population. While in the decision-tree, all children and young people in the model were assumed to have an increased mortality risk due to suicide following RSH, equal to that of the RSH state, regardless of their response to treatment, given that they were assumed to have self-harmed at model initiation.

Table 28: 6-month mortality by suicide probabilities for each 6-month model cycle in the study population

Model time-period	Cycle in the Markov model	Age	Risk of death (Men)		Risk of death (Women)	
			CYP self-harming (RSH state)	General population (non-RSH state)	CYP self-harming (RSH state)	General population (non-RSH state)
0-6 month[1]	--[1]	16	0.001116	0.000036	0.000620	0.000020
6-12 month	1		0.001116	0.000036	0.000620	0.000020
12-18 month	2	17	0.001116	0.000036	0.000620	0.000020
18-24 month	3		0.001116	0.000036	0.000620	0.000020
24-30 month	4	18	0.001116	0.000036	0.000620	0.000020
30-36 month	5		0.001116	0.000036	0.000620	0.000020
36-42 month	6	19	0.001116	0.000036	0.000620	0.000020
42-48 month	7		0.001116	0.000036	0.000620	0.000020

Model time-period	Cycle in the Markov model	Age	Risk of death (Men)		Risk of death (Women)	
			CYP self-harming (RSH state)	General population (non-RSH state)	CYP self-harming (RSH state)	General population (non-RSH state)
48-54 month	8	20	0.002573	0.000083	0.000775	0.000025
54-60 month	9		0.002573	0.000083	0.000775	0.000025

1 Decision tree part of the model
CYP: Children and young people; RSH: Repeated self-harm.

Utility input parameters

In order to express outcomes in the form of QALYs, the health states of the economic model (RSH, non-RSH, death by suicide) needed to be linked to appropriate utility scores. Utility scores represent the HRQoL associated with specific health states on a scale usually from 0 (death) to 1 (perfect health); they are estimated using preference-based measures that capture people's preferences on the HRQoL experienced in the health states under consideration.

To estimate QALYs for children and young people in the non-RSH state, the EQ-5D-derived utility value for young adults under 25 years of age in the general UK population was used (0.94 - Kind 1999). The utility value for children and young people who RSH was estimated using the EQ-5D-derived utility value reported in a UK study for 754 adolescents who self-harmed (0.68 - Tubeuf 2019). This study was a secondary analysis of a randomised controlled trial comparing family therapy with treatment as usual as an intervention for self-harming adolescents (Cottrel 2018). These EQ-5D-derived utility values were selected due to lack of more relevant data and were presented to the committee when developing the economic model. The committee expressed the view that both values were overestimates of the utility relating to each of the two health states, as they noted that people who have previously self-harmed (even though they have not self-harmed over the previous 6 months) are unlikely to reach the utility value of the general population (0.94 - Kind 1999), and people who have recently self-harmed (in the last 6 months) are unlikely to have a utility as high as 0.68 (Tubeuf 2019)], but noted that the difference in utility values between the two health states of RSH and non-RSH (0.93-0.68=0.25) is probably reflective of changes in HRQoL between these two states in children and young people, thus confirming the face validity of the differential utility data used in the model. Alternative utility data reported in a recent UK economic evaluation were tested in a sensitivity analysis (utility values were 0.76 and 0.80 for non-RSH and RSH health states, respectively) (Cottrell 2018). These utility values were collected by administering the EQ-5D questionnaire to the sample of children and young people (n=832) included in the RCT at 6, 12, and 18 months follow-up. When observing this evidence, the committee considered this difference in utility between the two health states to be very narrow and unlikely to be reflective of the true difference between the utility in the non-RSH and RSH health states; nevertheless, these data were still tested in sensitivity analysis to explore the impact of a potentially (even though unlikely) small change in HRQoL between the two health states on the results.

Discounting

Discounting at a rate of 3.5% was applied to costs and QALYs that accrued after the first year in the model, as per the NICE reference case (NICE 2020).

Handling uncertainty and presentation of the results

Relative cost effectiveness between DBT-A vs enhanced TAU was estimated using the incremental cost-effectiveness ratio (ICER). The ICER was calculated using the following formula:

$$ICER = \Delta C / \Delta E$$

where ΔC is the difference in total costs between two treatment options and ΔE the difference in their effectiveness (QALYs). The ICER expresses the extra cost per extra unit of benefit (QALY) associated with one treatment option relative to its comparator. If an option has an ICER of up to £20,000-£30,000/QALY relative to its comparator (NICE lower and upper cost-effectiveness threshold, respectively) then the intervention is considered to be cost-effective (NICE 2013). Estimation of such a ratio allowed consideration of whether the additional benefit was worth the additional cost when choosing one treatment option over another.

Model input parameters were synthesised in a probabilistic analysis. This means that the input parameters were assigned probability distributions (rather than being expressed as point estimates); this approach allowed more comprehensive consideration of the uncertainty characterising the input parameters. Subsequently, 10,000 iterations were performed, each drawing random values out of the distributions fitted onto the model input parameters. Results (mean costs and QALYs for each intervention) were averaged across the 10,000 iterations. This exercise provides more accurate estimates than those derived from a deterministic analysis (which utilises the mean value of each input parameter ignoring any uncertainty around the mean), by capturing the non-linearity characterising the economic model structure (Briggs 2006).

In addition, alternative scenarios were tested in sensitivity analysis. Three categories of sensitivity analyses (SA) were performed: 1) Univariate SAs to assess the sensitivity of the results to variations in single input parameters; 2) Multivariate SAs to assess the sensitivity of the results to variations in combinations of input parameters; and 3) Threshold SAs to assess by how much specific parameter values would need to change, for the conclusions of the analysis to change. In each scenario, probabilistic analysis was conducted (and probability distributions were used for each altered parameter), in order to take uncertainty around mean values into account.

Univariate SA explored the impact of the following input parameters:

- intensity and frequency of DBT-A: 1) extending the average number of intended sessions (individual psychotherapy and group skills training) delivered as part of the DBT-A intervention; 2) varying the average length of each DBT-A session; 3) assuming a different band for health professionals delivering the intervention
- healthcare cost associated with self-harm: increasing/decreasing the values used in the base-case analysis by 50%, as for the costs associated with using healthcare services for CYP who RHS and for CYP who did not RHS

Multivariate SA explored the impact of the following set of input parameters:

- low DBT-A delivery costs: 1) reducing the average length of each individual psychotherapy session (50 minutes); 2) reducing the average length of each group skills training session (60 minutes); and 3) assuming a lower professional's salary (AfC 6)
- QALY valuation: using alternative utility weights to attach to the RHS and no RSH health states (utility weights were 0.76 for RSH and 0.80 for no RSH – Cottrell 2018)

Finally, each of the following model inputs was tested by means of threshold SA, to explore at which value base-case analysis conclusions would change:

- risk of RSH after having RSH, either the baseline risk of RSH in the model and the risk of RSH after RSH after post-intervention
- healthcare cost associated with RSH *versus* no RSH
- DBT-A delivery cost

Table 29 provides information on the distributions assigned to input parameters in probabilistic sensitivity analyses.

Results of probabilistic analyses were presented in the form of cost effectiveness acceptability curves (CEACs), which demonstrated the probability of each of the 2 treatment options being the most cost effective at different levels of willingness-to-pay per QALY (that is, at different cost effectiveness thresholds the decision maker may set). Also, the cost effectiveness plane (CEP), which depicts the incremental costs and QALYs of DBT-A *versus* enhanced TAU alone (placed at the origin) was used to show the uncertainty around mean cost effectiveness outcomes of the model, represented as a cloud of points on the plane corresponding to the different 10,000 iterations of the economic model in the probabilistic analysis.

Table 29: Point estimates and probability distributions assigned to input parameters of the guideline economic model.

Input parameter	Point estimate	Probability distribution	Source - Comments
Relative effect			
RR of RSH at 6 months (DBT-A *versus* enhanced TAU)	0.69	Log-normal distribution: 95% CI 0.51 to 0.92	Estimated based on Cochrane systematic review and meta-analysis (Witt 2021b)
Utility weights			
• Base-case analysis			
○ Non-RSH state	0.94	Beta: α= 1118.29; β=71.38	Kind 1999, based on method of moments
○ RSH state	0.68	Beta: α=1529.74; β=719.88	Tubeuf 2019, based on method of moments
• Sensitivity analysis			
○ Non-RSH state	0.76	Beta: α= 2701.42; β= 675.36	Cottrell 2018, based on method of moments
○ RSH episode state	0.68	Beta: α= 1433.02; β= 452.53	
Costs			
Healthcare costs associated with self-harm			
○ Healthcare cost of RSH	£1,859	Gamma: α= 25.00; β= 74.34	Cottrell 2018
○ Healthcare cost of no RSH	£807	Gamma: α= 25.00; β= 32.96	Cottrell 2018
Number of DBT-A (individual and group) sessions			Based on available clinical evidence and committee's expert opinion, see Table 22
• Base-case analysis			
○ Intended number of sessions: 16	13.875	Attendance rate: 75%: 16; 16.7%: 5-15; 8.3%: 1-4	
• Sensitivity analysis			
○ Intended number of sessions: 26	22.208	Attendance rate: 75%: 26; 16.7%: 5-25; 8.3%: 1-4	
Unit cost of professionals delivering the DBTA-intervention (clinical psychologist)		Normal distribution	Curtis and Burns 2020 - Assumes SE=0.05*Mean For the estimation of unit cost, see Table 23
• Base-case analysis			
○ AfC Band 7	£138	SE = £6.91	

Input parameter	Point estimate	Probability distribution	Source - Comments
• Sensitivity analysis			
○ AfC Band 6	£114	SE = £5.71	
Risk of RSH and transition probabilities			
Baseline risk of RSH for CYP receiving enhanced TAU	0.142	Beta: α=58.93; β=358.07	Cotrell 2018; see text for details 'Clinical input parameters'
Transition probability of non-RSH to RSH state	0.076	Beta: α=31.33; β=385.67	
Transition probability of RSH to RSH state	0.256	Beta: α=106.24; β=310.76	
Other model inputs			
SMRs by suicide after self-harm	31.0	Log-normal distribution: 95% CI 15.50 to 61.90	Bergen 2012
Gender (% Women)	0.745	Beta: α=3878.000; β=1327.000	Hawton 2012
Age at start of the model	16	No distribution	

Development and validation of the economic model

Please see for details about the methods followed to develop and validate the economic model 'Development and validation of the economic models'.

Economic modelling results

Base-case analysis

The average total costs from the 10,000 iterations were £8,494 and £10,292 per person for the enhanced TAU and DBT-A arms, respectively; the average incremental QALY was 0.01 for the DBT-A intervention compared to enhanced TAU (Table 30). Accordingly, the average ICER was £268,601 per QALY gained, which is well above the NICE cost-effectiveness threshold of £20,000/QALY.

Table 30: Probabilistic cost effectiveness estimates for DBT-A compared with enhanced TAU at 5-years time horizon

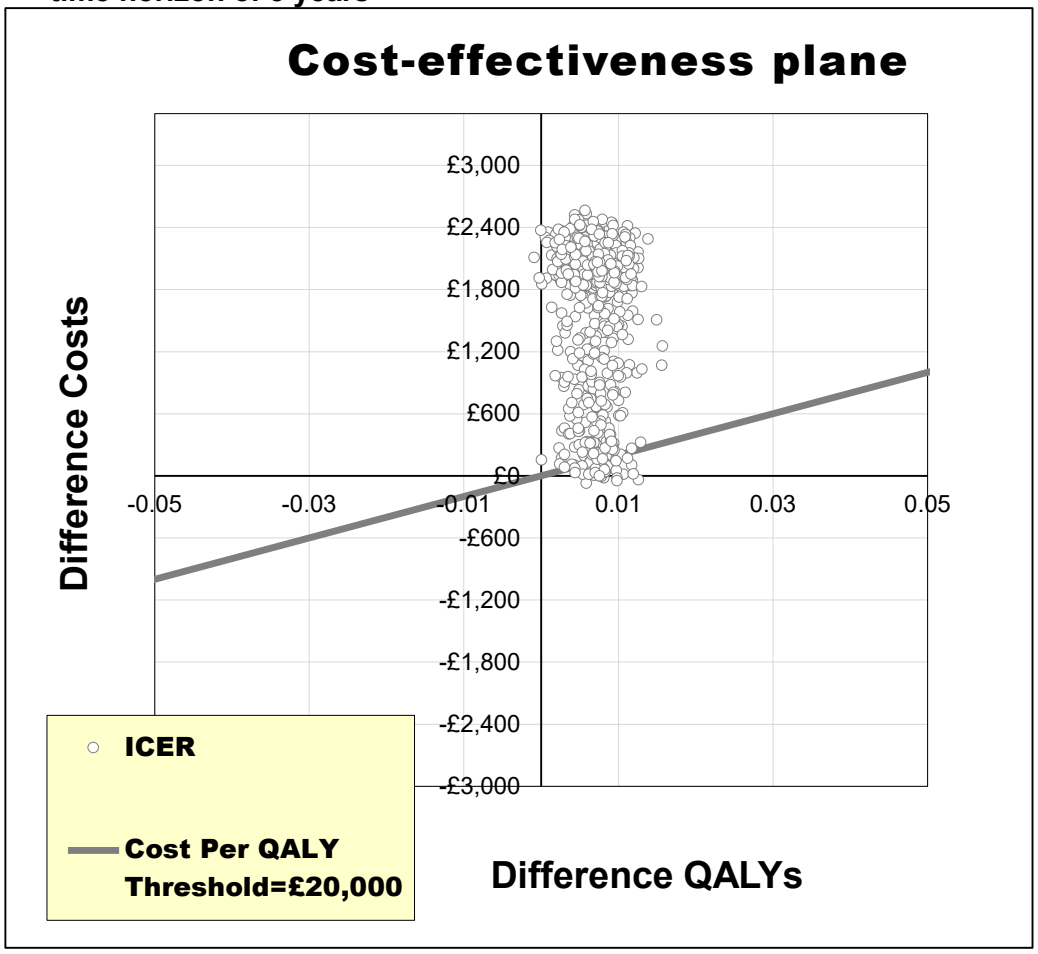
Enhanced TAU		
	Costs (£), mean – *SD*	£ 8,494 – *1,247*
	QALY, mean – *SD*	4.18 – 0.03
DBT-A		
	Costs (£), mean – *SD*	£ 10,292 – *1,404*
	QALY, mean – *SD*	4.17 – 0.03
DBT-A *versus* enhanced TAU		
	Incremental cost, mean – *SD*	£ 1,799 – *630*
	Incremental QALY, mean – *SD*	0.01 – *0.00*
	ICER (£/QALY)	£ 268,601

£: pound sterling; DBT-A: Dialectical behaviour therapy adapted for adolescents; ICER: incremental cost effectiveness ratio; QALY: quality-adjusted life year; SD: standard deviation; TAU: Treatment as usual

Figure 8 shows the cost effectiveness plane for DBT-A compared with enhanced TAU at 5-years based on 10,000 iterations. The diagonal line represents the willingness to pay per QALY threshold of £20,000. Nearly all the simulation estimates are on the right of the y-axis, showing that the DBT-A is most likely to be more effective than enhanced TAU. Also, almost all of the ICERs are in the north-east quadrant (99.5% of the 10,000 iterations), where DBT-A

results in higher costs compared with enhanced TAU. Of these, just 2.5 % are below the line showing the NICE threshold of £20,000 per QALY gained. In addition, only 0.5% of the estimates are in the south-east quadrant (50 of the 10,000 iterations), showing that, in those iterations, DBT-A led to lower costs and higher benefits compared with enhanced TAU. Overall, results suggest that DBT-A is not cost effective compared to enhanced TAU: using a cost per QALY threshold of £20,000, DBT-A had a 3% (2.5% + 0.5%) chance of being cost-effective.

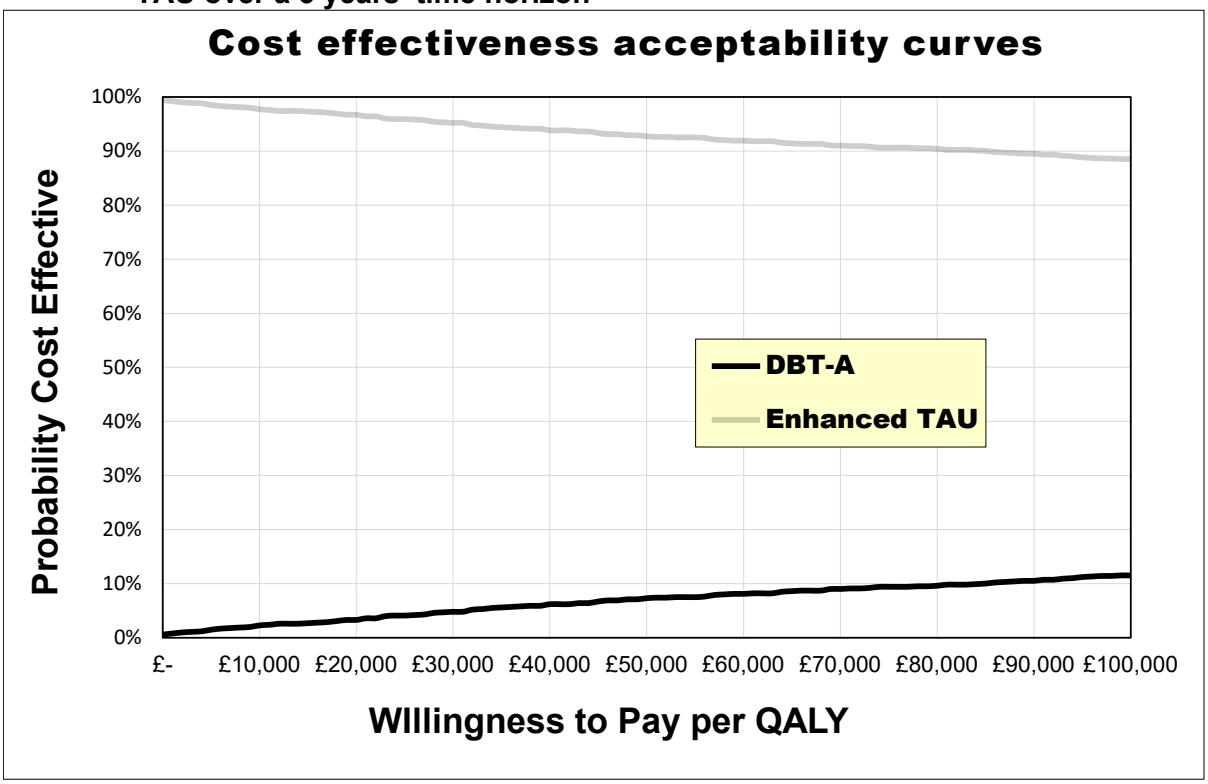
Figure 8: Cost effectiveness plane of DBT-A compared with enhanced TAU over a time horizon of 5 years



£: pound sterling; ICER: incremental cost effectiveness ratio; QALY: quality-adjusted life year

A cost effectiveness acceptability curve of the DBT-A intervention compared with enhanced TAU is presented in Figure 9. At a threshold of £20,000, DBT-A had a 3% chance of being cost effective, and this percentage increased to 6% when the threshold was £30,000. There is a positive relationship between the cost effectiveness threshold and the chance of DBT-A being cost effective, and this is because the DBT-A intervention was, on average, slightly more effective (in terms of QALY gains) than enhanced TAU, while being heavily more costly.

Figure 9: Cost effectiveness acceptability curves for DBT-A compared with enhanced TAU over a 5 years' time horizon



£: pound sterling; DBT-A: Dialectical behaviour therapy adapted for adolescents; ICER: incremental cost effectiveness ratio; QALY: quality-adjusted life year; TAU: treatment-as-usual.

Sensitivity analysis

To account for uncertainty in the incremental costs and QALYs estimation, a number of probabilistic univariate sensitivity analyses were conducted (Table 31). The first sensitivity analyses included making different assumptions about the delivery of the DBT-A intervention: 1) varying the average number of individual psychotherapy and group skills training sessions delivered, as defined earlier in the methods (section 'Handling uncertainty and presentation of the results'); 2) varying the average length of each DBT-A session, either individual or group; 3) assuming different healthcare professional's salary bands. By exploring these model's assumptions, the delivery of DBT-A remained unlikely to be cost effective in children and young people who RHS at 5 years time horizon in all cases (Table 31). The second probabilistic univariate sensitivity analyses included making different assumptions about the healthcare costs associated with no RSH or incurred by CYP following an episode of RSH. Also by exploring these assumptions, the delivery of DBT-A remained unlikely to be cost-effective compared to enhanced TAU. As for the base-case analyses, these results suggest that DBT-A is slightly more effective and heavily more costly than enhanced TAU, and so, as the value placed on a QALY increases, the likelihood that the intervention is cost effective rises marginally.

Table 31: Probabilistic cost effectiveness estimates for DBT-A compared with enhanced TAU – Univariate sensitivity analysis

DBT-A *versus* enhanced TAU – Assumptions			ICER (£/QALY)	Probability of being cost effective at a threshold of:	
				£20,000 per QALY	£30,000 per QALY
Base case analysis		**-**	**£ 268,601***	**3 %**	**6 %**
Assuming a different average number of (individual and group) sessions delivered as part of the DBT-A intervention[1]		26	£ 514,213*	0 %	0%
Assuming a different average length of each DBT-A session (minutes)	Individual psychotherapy	50	£ 245,354*	4 %	6 %
		55	£ 246,267*	4 %	6 %
	Group skills training	60	£ 198,3298	11 %	12%
		100	£ 245,564*	7 %	8 %
Assuming a different professional's salary		AfC 6	£ 196,840*	8 %	9 %
Assuming healthcare costs lower than 50%	associated with RSH	£ 929	£267,744*	2 %	3 %
	associated with no RSH	£ 403	£ 267,343*	3 %	4%

£: pound sterling; AfC: agenda for change; DBT-A: Dialectical behaviour therapy adapted for adolescents; ICER: incremental cost effectiveness ratio; QALY: quality-adjusted life year; RSH: repeated self-harm; TAU: treatment-as-usual.
** non cost effective results*

Besides univariate sensitivity analyses, two probabilistic multivariate sensitivity analyses were conducted to study the combined effect of some input parameters on the results of the economic model (Table 32). The first analysis included reducing simultaneously the average length of each individual and group session of DBT-A and assuming a lower professional's salary. Under such a scenario of low delivery costs, DBT-A remained not cost-effective (Table 32) compared with enhanced TAU, but its probability of being a cost-effective intervention increased to some extent. By means of the second multivariate sensitivity analysis, the usage of alternative QALY valuation has been explored (using utility weights to attach to the RHS and no RSH health states of 0.76 and 0.80, respectively – Cottrell 2018); over this scenario, DBT-A remained not cost effective compared to enhanced TAU, with a lower probability of being cost-effective compared to the base-case analysis (Table 32).

Table 32: Probabilistic cost effectiveness estimates for DBT-A compared with enhanced TAU – Multivariate sensitivity analysis

DBT-A *versus* enhanced TAU – Scenarios explored			ICER (£/QALY)	Probability of being cost effective at a threshold of:	
				£20,000 per QALY	£30,000 per QALY
Base case analysis		**-**	**£ 268,601***	**3 %**	**6 %**
Low DBT-A delivery costs	1) reducing the average length of each individual session	50 minutes	£ 100,334*	16 %	17 %
	2) reducing the average length of each group session	60 minutes			
	3) assuming a lower professional's salary	AfC 6			

DBT-A *versus* enhanced TAU – Scenarios explored			ICER (£/QALY)	Probability of being cost effective at a threshold of:	
				£20,000 per QALY	£30,000 per QALY
Alternative QALYs valuation	Using alternative utility weights to attach to the RHS and no RSH health states	utility weights were 0.76 for RSH and 0.80 for no RSH – Cottrel 2018	£ 387,005*	2 %	3 %

£: pound sterling; AfC: agenda for change; DBT-A: Dialectical behaviour therapy adapted for adolescents; ICER: incremental cost effectiveness ratio; QALY: quality-adjusted life year; RSH: repeated self-harm; TAU: treatment-as-usual.
** non cost effective results*

Finally, as suggested by the findings of the threshold sensitivity analysis (Table 33), compared to enhanced TAU the DBT-A intervention will be cost effective if: 1) the risk of RSH after RSH in the model population would be at least 69% (in the base-case analysis this value was 14% under enhanced TAU, in the decision tree component, and 26% in the Markov model component); or the delivery cost of DBT-A would be at maximum £1,135 (instead of £2,801 with the base-case scenario); or the healthcare costs incurred by children and young people following an episode of RSH would be at least £55,000 (in base-case analysis this value was £1,859)

Table 33: Cost effectiveness estimates for DBT-A compared with enhanced TAU – Threshold sensitivity analysis

DBT-A *versus* enhanced TAU – Input parameters		Base-case value	Target value to be cost-effective[1]	
			Absolute target value	% Change[2]
Risk of RSH after RSH	Baseline risk	0.14	0.69	+ 393%
	Post-intervention	0.26		+ 165%
DBT-A cost		£ 2, 801	£ 1,135	-59%
NHS costs associated with RSH		£1,859	£ 55,000	2859%

1 £20,000 per QALY gain
2 relative to base case value
£: pound sterling; AfC: agenda for change; DBT-A: Dialectical behaviour therapy adapted for adolescents; ICER: incremental cost effectiveness ratio; RSH: repeated self-harm; TAU: treatment-as-usual.

Discussion

The primary purpose of this economic model was to assess the relative cost-effectiveness of DBT-A *versus* enhanced TAU for children and young people following an episode of RHS. Our results suggest that the ICER for DBT-A is well above the NICE threshold of £20,000 per QALY over 5 years; therefore, DBT-A is not a cost-effective psychological therapy compared to the enhanced TAU. Secondly, starting with our base-case economic scenario, we aimed to simulate costs and effectiveness data exploring a number of scenarios; such as a different delivery mode of DBT-A, or varying the most relevant model's assumptions (for example, NHS cost parameters, clinical input parameters, and QALY valuation). By exploring all these model's assumptions, the delivery of DBT-A remained unlikely to be cost effective in children and young people who RHS, suggesting confidence around models' results when model assumptions varied. According to the committee's advice, the only plausible change in input

parameters that would make DBT-A cost-effective is when the baseline risk of self-harm repetition combined with the risk of RSH following RSH in the model population would be at least 69%, which would be reflecting the healthcare circumstances and needs of a particular sub-group of CYP who RSH, such as those CYP at very high risk of self-harmrecurrence. Summing up, the present economic model shows that DBT-A is a very costly intervention with relatively low benefits for the overall population of CYP who RSH. On the other hand, the present analysis suggests that DBT-A might be a cost-effective treatment in the specific subgroup of CYP who RSH and have a very high risk of repeating self-harm over time, incurring high management costs, such as CYP with significant emotional dysregulations who have frequent episodes of self-harm, as noted by the committee. When discussing the evidence and drafting the recommendations for this area of the guideline, the committee pointed out all the above considerations.

None of the analyses identified in the economic evidence review were focused on DBT for people who RSH, except for Haga (2018) and Priebe (2012); both studies were cost-effectiveness analyses conducted alongside RCTs; with the one study from Norway and (Haga 2018) and the other one from the UK (Priebe 2012). Haga (2018) compared the cost-effectiveness of DBT-A to enhanced TAU in adolescents who self-harmed, mostly individuals with borderline personality disorder, with its results suggesting that DBT-A had a high probability of being a cost-effective psychological treatment. Priebe (2012) compared the cost-effectiveness of DBT with TAU in adults with borderline personality disorder who have self-harmed in the UK. The results were inconclusive mostly because DBT was found to be more effective in reducing self-harm and more costly than TAU, but no QALYs were estimated. The committee found both economic analysis partially applicable to the decision-making context as they included mostly people who self-harmed with borderline personality disorder and they did not use the QALY as the measure of outcome. Therefore, the present analysis makes an important contribution to the existing evidence on the cost effectiveness of DBT-A in children and young people who RSH using incremental costs per QALY gained as the primary outcome measure, adopting a longer-term analytical time horizon; and obtaining effectiveness data from the Cochrane review and meta-analysis of clinical evidence (Witt 2021b), which informed the guideline.

The findings of the present model may be restricted by the paucity of self-harm related utility data. In the economic model, 2 different sets of utility data were used to reflect the health-related quality of life associated with RSH and no RSH. The first set of utility data (No RSH: 0.94 and RSH: 0.68; Kind 1999 and Tubeuf 2019 respectively) were considered by the committee to reflect the difference in utility between the two health states, although each value appeared to be an overestimate of the HRQoL in the respective health state. The difference between the two health states of the second set of utility data were considered by the committee too narrow (RSH: 0.76 and no RSH: 0.80 – Cottrell 2018). Nevertheless, no alternative utility data were available, and therefore, after considering the available data, it was suggested to use the first set of utility values in the base-case analysis, and investigate the second set of utility data (Cottrell 2018) in sensitivity analysis.

Overall conclusions from the guideline economic analysis

The results of the guideline economic analysis suggest that DBT-A for CYP who have self-harmed is not cost-effective from a NHS and personal social services perspective, compared to enhanced TAU. Based on the findings of the economic model and supplemented by the results of the clinical review, the committee pointed out the important role played by DBT-A only in the management of self-harm recurrence in CYP who self-harmed and are at very high risk of self-harm repetition over time, such as CYP with significant motional dysregulations who have frequent episodes of self-harm.

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Witt 2021b

Witt KG, Hetrick SE, Rajaram G, Hazell P, Taylor Salisbury TL, Townsend E, Hawton K. Interventions for self-harm in children and adolescents. Cochrane Database of Systematic Reviews 2021, Issue 3. Art. No.: CD013667. DOI: 10.1002/14651858.CD013667.pub2

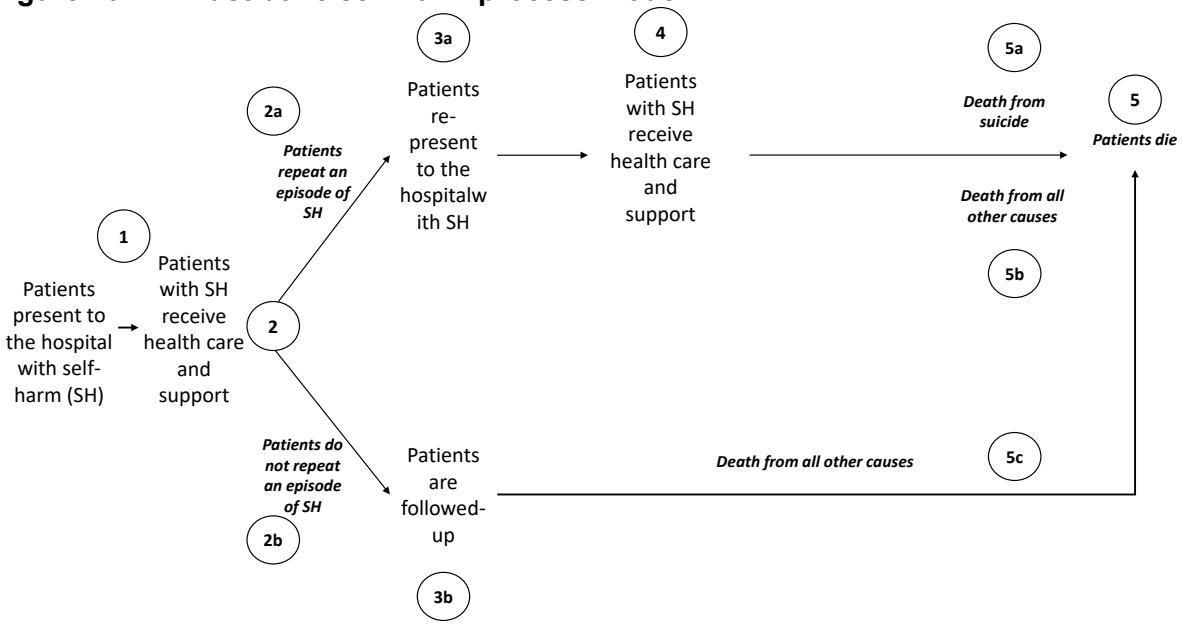
Development and validation of the economic models

The model development and validation process of both economic analyses ('CBT-informed psychological intervention for adults who have self-harmed', and 'DBT-A for children and young people who have self-harmed') has been guided by the framework suggested by Tappenden (2016). To better understand the decision problem faced by the economic models, a comprehensive analysis of the self-harm economic evidence along with an early engagement with the guideline committee have been performed. First, a 'self-harm process

model' was used to identify what was more important for the guideline committee decision-making, in terms of relevant clinical events and processes within the management of self-harm (Figure 10). At each point in the pathway shown in Figure 10, the focus is on patients who RSH:

1. People present to an emergency department at a general hospital with self-harm repetition
2. After having received health care support and treatment, people will either: a) repeat an episode of self-harm; b) not repeat an episode of self-harm
3. In case of repetition of self-harm, people would re-present to an emergency department at a general hospital; In case people do not repeat self-harm after having received health care assistance and support, there is in place a follow-up programme
4. After having re-presented, they are managed across different care settings
5. In the short/medium-term period (for example, 1 to 5 years), people who have self-harmed can die because: a) of suicide -after a repeated episode of self-harm; b) of any other cause of death but suicide -after a repeated episode of self-harm; c) of any other cause of death but self-harm

Figure 10: Illustrative self-harm process model

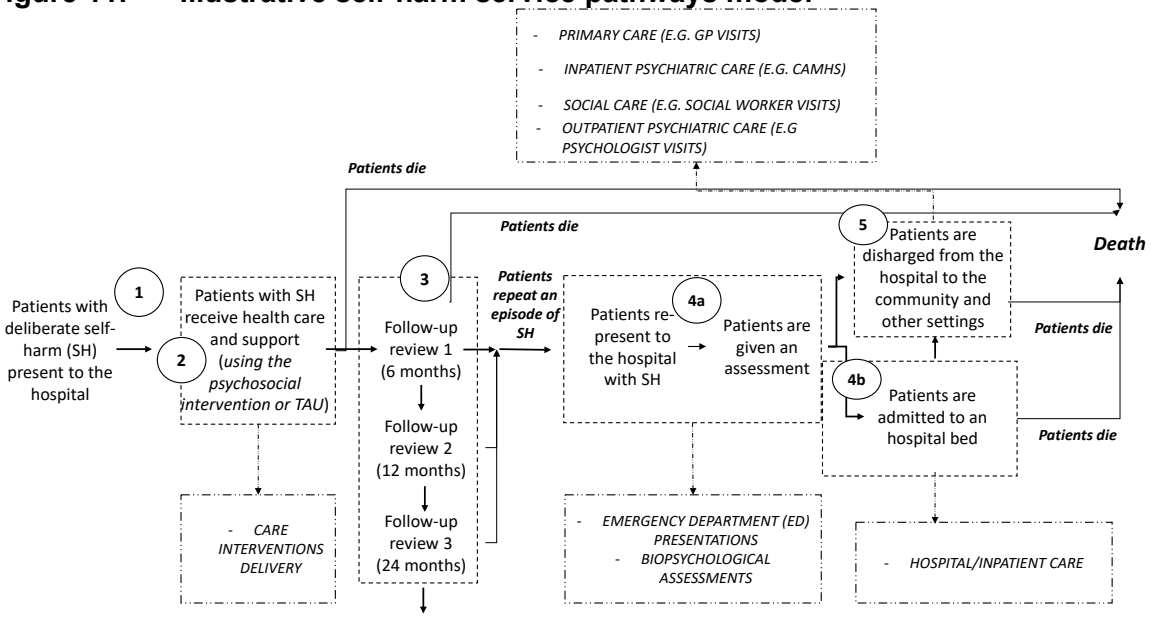


Second, a 'self-harm service pathway model' was designed to include all relevant resource components in the economic model, bearing in mind the potential impacts of the interventions in the care of people who RSH (Figure 11). This model was mostly concerned on what is known/believed by healthcare professionals and decision-makers, in terms of accessing and using health care following RSH (Figure 11):

6. Patients with a recent episode of RSH (within 6 months) re-present to hospital for self-harm as a result of any type of non-fatal self-poisoning or self-injury;
7. They receive either CBT-based psychotherapy in addition to TAU or TAU alone after having received a care intervention they are followed-up for an overall period of 5 years.
8. At the end or during this follow-up period, these patients can either repeat or not an episode of self-harm
9. In the case of self-harm repetition, they will present to an acute general hospital or primary care, in either way they will receive a comprehensive biopsychosocial assessment
10. In the case of self-harm repetition, and after having received biopsychosocial assessment: a) patients can require hospital/inpatient care; b) patients who no longer require acute/physical care are discharged from the hospital to other care settings

(including primary care, inpatient psychiatric care, social care, and outpatient psychiatric care).

Figure 11: Illustrative self-harm service pathways model



The committee confirmed that both conceptual frameworks (Figure 10, Figure 11) included explicit reference to all clinically meaningful events and did described the disease process in terms of healthcare resource use comprehensively by not discriminating between different age subgroups of patients (adults and CYP).

Finally, as part of the model validation, the identification of evidence sources and selection of relevant input parameters to inform both economic models was performed by the guideline health economist, checked for accuracy by another health economist and agreed with a health-economics sub-group formed by members of the committee for this purpose (Kaltenthaler 2011). Finally, all inputs and models' formulae were systematically checked; the models were tested for logical consistency by setting input parameters to null and extreme values and examining whether results changed in the expected direction. The base-case results and results of sensitivity analyses were discussed with the committee to confirm their plausibility.

References

Kaltenthaler 2011

Kaltenthaler E, Tappenden P, Paisley S, Squires H. NICE DSU Technical Support Document 13: Identifying and Reviewing Evidence to Inform the Conceptualisation and Population of Cost-Effectiveness Models. London: National Institute for Health and Care Excellence; 2011

Tappenden 2016

Tappenden P. Conceptual modelling for health economic model development. Available from: http://eprints.whiterose.ac.uk/74464/1/HEDSDP1205.pdf

Appendix J Excluded studies

Excluded studies for review question: What psychological and psychosocial interventions (including safety plans and electronic health-based interventions) are effective for people who have self-harmed?

Excluded effectiveness studies

See the Characteristics of excluded studies table from the Cochrane review of Psychosocial interventions for self-harm in adults and the Characteristics of excluded studies table from the Cochrane review of Interventions for self-harm in children and adolescents.

Excluded economic studies

Table 34: Excluded studies from the guideline economic review

Study	Reason for Exclusion
Adrian, M., Lyon, A. R., Nicodimos, S., Pullmann, M. D., McCauley, E., Enhanced "Train and Hope" for Scalable, Cost-Effective Professional Development in Youth Suicide Prevention, Crisis, 39, 235-246, 2018	Not relevant to any of the review questions in the guideline - this study examined the impact of an educational training ongoing intervention, and the effect of the post-training reminder system, on mental health practitioners' knowledge, attitudes, and behaviour surrounding suicide assessment and intervention. As well, this study was not a full health economic evaluation
Borschmann R, Barrett B, Hellier JM, et al. Joint crisis plans for people with borderline personality disorder: feasibility and outcomes in a randomised controlled trial. Br J Psychiatry. 2013;202(5):357-364.	Not relevant to any of the review questions in the guideline - this study examined the feasibility of recruiting and retaining adults with borderline personality disorder to a pilot randomised controlled trial investigating the potential efficacy and cost-effectiveness of using a joint crisis plan
Bustamante Madsen, L., Eddleston, M., Schultz Hansen, K., Konradsen, F., Quality Assessment of Economic Evaluations of Suicide and Self-Harm Interventions, Crisis, 39, 82-95, 2018	Study design - this review of health economics studies has been excluded for this guideline, but its references have been hand-searched for any relevant health economic study
Byford, S., Barrett, B., Aglan, A., Harrington, V., Burroughs, H., Kerfoot, M., Harrington, R. C., Lifetime and current costs of supporting young adults who deliberately poisoned themselves in childhood and adolescence, Journal of Mental Health, 18, 297-306, 2009	Study design – no comparative cost analysis
Byford, S., Leese, M., Knapp, M., Seivewright, H., Cameron, S., Jones, V., Davidson, K., Tyrer, P., Comparison of alternative methods of collection of service use data for the economic evaluation health care interventions, Health Economics, 16, 531-536, 2007	Study design – no comparative cost analysis
Byford, Sarah, Barber, Julie A., Harrington, Richard, Barber, Baruch Beautrais Blough Brent Brodie Byford Carlson Chernoff Collett Fergusson Garland Goldberg Harman Harrington Hawton Huber Kazdin Kazdin Kerfoot Kerfoot Kerfoot Knapp Lindsey McCullagh Miller Netten Reynolds Sadowski Shaffer Simms Wu, Factors that influence the cost of deliberate self-poisoning in children and adolescents, Journal of Mental Health Policy and Economics, 4, 113-121, 2001	Study design – no comparative cost analysis

Study	Reason for Exclusion
Denchev, P., Pearson, J. L., Allen, M. H., Claassen, C. A., Currier, G. W., Zatzick, D. F., Schoenbaum, M., Modeling the cost-effectiveness of interventions to reduce suicide risk among hospital emergency department patients, Psychiatric Services, 69, 23-31, 2018	Not relevant to any of the review questions in the guideline - this study estimated the cost-effectiveness of outpatient interventions (Postcards, Telephone outreach, Cognitive Behaviour Therapy) to reduce suicide risk among patients presenting to general hospital emergency departments
Dunlap, L. J., Orme, S., Zarkin, G. A., Arias, S. A., Miller, I. W., Camargo, C. A., Sullivan, A. F., Allen, M. H., Goldstein, A. B., Manton, A. P., Clark, R., Boudreaux, E. D., Screening and Intervention for Suicide Prevention: A Cost-Effectiveness Analysis of the ED-SAFE Interventions, Psychiatric services (Washington, D.C.), appips201800445, 2019	Not relevant to any of the review questions in the guideline - this study estimated the cost-effectiveness of suicide screening followed by an intervention to identify suicidal individuals and prevent recurring self-harm
Fernando, S. M., Reardon, P. M., Ball, I. M., van Katwyk, S., Thavorn, K., Tanuseputro, P., Rosenberg, E., Kyeremanteng, K., Outcomes and Costs of Patients Admitted to the Intensive Care Unit Due to Accidental or Intentional Poisoning, Journal of Intensive Care Medicine, 35, 386-393, 2020	Study design – no comparative cost analysis
Flood, C., Bowers, L., Parkin, D., Estimating the costs of conflict and containment on adult acute inpatient psychiatric wards, Nursing economic$, 26, 325-330, 324, 2008	Study design – no comparative cost analysis
Fortune, Z., Barrett, B., Armstrong, D., Coid, J., Crawford, M., Mudd, D., Rose, D., Slade, M., Spence, R., Tyrer, P., Moran, P., Clinical and economic outcomes from the UK pilot psychiatric services for personality-disordered offenders, International Review of Psychiatry, 23, 61-9, 2011	Not relevant to any of the review questions in the guideline
George, S., Javed, M., Hemington-Gorse, S., Wilson-Jones, N., Epidemiology and financial implications of self-inflicted burns, Burns, 42, 196-201, 2016	Study design – no comparative cost analysis
Gunnell, D., Shepherd, M., Evans, M., Are recent increases in deliberate self-harm associated with changes in socio-economic conditions? An ecological analysis of patterns of deliberate self-harm in Bristol 1972-3 and 1995-6, Psychological medicine, 30, 1197-1203, 2000	Study design - cost-of-illness study
Kapur, N., House, A., Dodgson, K., Chris, M., Marshall, S., Tomenson, B., Creed, F., Management and costs of deliberate self-poisoning in the general hospital: A multi-centre study, Journal of Mental Health, 11, 223-230, 2002	Study design – no comparative cost analysis
Kapur, N., House, A., May, C., Creed, F., Service provision and outcome for deliberate self-poisoning in adults - Results from a six centre descriptive study, Social Psychiatry and Psychiatric Epidemiology, 38, 390-395, 2003	Study design – no comparative cost analysis
Kinchin, I., Russell, A. M. T., Byrnes, J., McCalman, J., Doran, C. M., Hunter, E., The cost of hospitalisation for youth self-harm: differences across age groups, sex, Indigenous and non-	Study design – no comparative cost analysis

Study	Reason for Exclusion
Indigenous populations, Social Psychiatry and Psychiatric Epidemiology, 55, 425-434, 2020	
O'Leary, F. M., Lo, M. C. I., Schreuder, F. B., "Cuts are costly": A review of deliberate self-harm admissions to a district general hospital plastic surgery department over a 12-month period, Journal of Plastic, Reconstructive and Aesthetic Surgery, 67, e109-e110, 2014	Study design – no comparative cost analysis
Olfson, M., Gameroff, M. J., Marcus, S. C., Greenberg, T., Shaffer, D., National trends in hospitalization of youth with intentional self-inflicted injuries, American Journal of Psychiatry, 162, 1328-1335, 2005	Study design – no comparative cost analysis
Ostertag, L., Golay, P., Dorogi, Y., Brovelli, S., Cromec, I., Edan, A., Barbe, R., Saillant, S., Michaud, L., Self-harm in French-speaking Switzerland: A socio-economic analysis (7316), Swiss Archives of Neurology, Psychiatry and Psychotherapy, 70 (Supplement 8), 48S, 2019	Conference abstract
Ougrin, D., Corrigall, R., Poole, J., Zundel, T., Sarhane, M., Slater, V., Stahl, D., Reavey, P., Byford, S., Heslin, M., Ivens, J., Crommelin, M., Abdulla, Z., Hayes, D., Middleton, K., Nnadi, B., Taylor, E., Comparison of effectiveness and cost-effectiveness of an intensive community supported discharge service versus treatment as usual for adolescents with psychiatric emergencies: a randomised controlled trial, The Lancet Psychiatry, 5, 477-485, 2018	Not self-harm. In addition, the interventions evaluated in this economic analysis (a supported discharge service provided by an intensive community treatment team compared to usual care) were not relevant to any review questions
Palmer, S., Davidson, K., Tyrer, P., Gumley, A., Tata, P., Norrie, J., Murray, H., Seivewright, H., The cost-effectiveness of cognitive behavior therapy for borderline personality disorder: results from the BOSCOT trial, Journal of Personality Disorders, 20, 466-481, 2006	Not self-harm
Quinlivan L, Steeg S, Elvidge J, et al. Risk assessment scales to predict risk of hospital treated repeat self-harm: A cost-effectiveness modelling analysis. J Affect Disord. 2019;249:208-215.	Not relevant to any of the review questions in the guideline - this study estimated the cost-effectiveness of of risk assessment scales versus clinical assessment for adults attending an emergency department following self-harm
Richardson JS, Mark TL, McKeon R. The return on investment of postdischarge follow-up calls for suicidal ideation or deliberate self-harm. Psychiatr Serv. 2014;65(8):1012-1019.	Not enough data reporting on cost-effectiveness findings
Smits, M. L., Feenstra, D. J., Eeren, H. V., Bales, D. L., Laurenssen, E. M. P., Blankers, M., Soons, M. B. J., Dekker, J. J. M., Lucas, Z., Verheul, R., Luyten, P., Day hospital versus intensive out-patient mentalisation-based treatment for borderline personality disorder: Multicentre randomised clinical trial, British Journal of Psychiatry, 216, 79-84, 2020	Not self-harm
Tsiachristas, A., Geulayov, G., Casey, D., Ness, J., Waters, K., Clements, C., Kapur, N., McDaid, D., Brand, F., Hawton, K., Incidence and general hospital costs of self-harm across England: estimates based on the multicentre study of self-	Study design – no comparative cost analysis

Study	Reason for Exclusion
harm, Epidemiology & Psychiatric Science, 29, e108, 2020	
Tsiachristas, A., McDaid, D., Casey, D., Brand, F., Leal, J., Park, A. L., Geulayov, G., Hawton, K., General hospital costs in England of medical and psychiatric care for patients who self-harm: a retrospective analysis, The Lancet Psychiatry, 4, 759-767, 2017	Study design – no comparative cost analysis
Tubeuf, S., Saloniki, E. C., Cottrell, D., Parental Health Spillover in Cost-Effectiveness Analysis: Evidence from Self-Harming Adolescents in England, PharmacoEconomics, 37, 513-530, 2019	This study is not a separate study from one already included in the guideline for topic 5.2 (Cottrel 2018). This secondary analysis presents alternative parental health spillover quantification methods in the context of a randomised controlled trial comparing family therapy with treatment as usual as an intervention for self-harming adolescents of (Cottrel 2018), and discusses the practical limitations of those methods
Tyrer, P., Thompson, S., Schmidt, U., Jones, V., Knapp, M., Davidson, K., Catalan, J., Airlie, J., Baxter, S., Byford, S., Byrne, G., Cameron, S., Caplan, R., Cooper, S., Ferguson, B., Freeman, C., Frost, S., Godley, J., Greenshields, J., Henderson, J., Holden, N., Keech, P., Kim, L., Logan, K., Manley, C., MacLeod, A., Murphy, R., Patience, L., Ramsay, L., De Munroz, S., Scott, J., Seivewright, H., Sivakumar, K., Tata, P., Thornton, S., Ukoumunne, O. C., Wessely, S., Randomized controlled trial of brief cognitive behaviour therapy versus treatment as usual in recurrent deliberate self-harm: The POPMACT study, Psychological medicine, 33, 969-976, 2003	Study design - no economic evaluation
Van Roijen, L. H., Sinnaeve, R., Bouwmans, C., Van Den Bosch, L., Cost-effectiveness and Cost-utility of Shortterm Inpatient Dialectical Behavior Therapy for Chronically Parasuicidal BPD (Young) Adults, Journal of Mental Health Policy and Economics, 18, S19-S20, 2015	Conference abstract
van Spijker, B. A., Majo, M. C., Smit, F., van Straten, A., Kerkhof, A. J., Reducing suicidal ideation: cost-effectiveness analysis of a randomized controlled trial of unguided web-based self-help, Journal of medical Internet research, 14, e141, 2012	Not self-harm

Appendix K Research recommendations

Research recommendations for review question: What psychological and psychosocial interventions (including safety plans and electronic health-based interventions) are effective for people who have self-harmed?

Research question

What is the effectiveness of specific psychological interventions including digital vs face-to face (technology use) in different populations and settings?

Why this is important

Although there has been increased research attention on determining the effectiveness of different psychological interventions for people who have self-harmed, it is not clear which interventions work for whom, what the active ingredients are, and the extent to which mode of delivery (digital vs face-to face) affects the effectiveness.

Table 35: Research recommendation rationale

Research question	What is the effectiveness of specific psychological interventions including digital vs face-to face (technology use) in different populations?
Why is this needed	
Importance to 'patients' or the population	Self-harm is a major public health concern, an indicator of distress and a risk factor for suicide. People who self-harm receive inconsistent care and it is also not clear whether the care they receive is tailored or appropriate to their needs. However, the findings from this research will hopefully lead to a better match between the characteristics of the patient and their needs.
Relevance to NICE guidance	The relative absence of evidence regarding this topic currently restricts NICE guidance from making recommendations about which psychological intervention is optimal for different populations. The outcome of this research would allow such recommendations to be developed and become part of NICE guidance.
Relevance to the NHS	There are at least 200,000 presentations to the ED following self-harm each year in England, many of whom will be repeat presentations. The findings from this research should contribute better treatment for self-harm and also a reduced number self-harm presentations to ED and other NHS settings.
National priorities	Self-harm is a risk factor for suicide, and reducing the rates of suicide is a national priority as is the prioritising of mental health and wellbeing nationally.
Current evidence base	There is an evidence base for the effectiveness of a number of longer term (for example, cognitive behaviour therapy) and brief psychological interventions (for example, safety planning) but it isn't clear whether they are effective for key populations (for example, men, people who repeatedly self-harm), or why they might work.
Equality	It is unclear whether the psychological interventions are equally effective across different groups of people.
Feasibility	Can the psychological interventions be delivered digitally and across a range of healthcare settings?
Other comments	None

ED: emergency department

Table 36: Research recommendation modified PICO table

Criterion	Explanation
Population	• Men who self-harm, • young people who self-harm • people who repeatedly self-harm
Intervention	One of the psychological interventions currently shown to be effective in reducing self-harm such as: • CBT • DBT-A • Safety plans
Comparator	• Standard care • Remote versus face to face intervention
Outcomes	• Incidence and frequency of self-harm • Patient satisfaction • Distress
Study design	RCT with process evaluation (qualitative component)
Timeframe	2-5 years
Additional information	The research should explicitly investigate effective components of the psychological interventions, including therapeutic relationship, real world experience of embedding psychosocial assessment in the intervention

CBT: cognitive behavioural therapy; DBT-A: dialectic behavioural therapy for adolescents; RCT: randomised controlled trial