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Exploring the issues of valuing child and adolescent health states using a mixed sample of adolescents and adults

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Abstract

Preferences for child and adolescent health states used to generate health state utility values can be elicited from adults, young adults, adolescents, or combinations of these. This commentary paper provides a critical overview of issues and implications arising from valuing child and adolescent health states using a novel approach of a mixed sample of adolescents and adults. The commentary is informed by critical analysis of normative, ethical, practical and theoretical arguments in the health state valuation literature. Discussion focusses upon: adolescent empowerment, understanding and psychosocial maturity; ethical concerns; elicitation tasks; perspective; and selection of sample proportions across adolescents and adults. It is argued that valuation of child and adolescent health states by both adolescents and adults could involve all participants completing the same preference elicitation task using the same perspective (for example, time trade-off imagining they are living in the health state), and all preferences being modelled to generate a combined value set that reflects both adolescent and adult preferences. It is concluded that the valuation of child and adolescent health states by a mixed adolescent and adult sample appears feasible and has the advantage that it includes some of the population who can potentially experience the health states, thus enabling adolescents to express their views around matters that may affect them, and the population that are taxpayers and voters. However, both the relative proportion of adults and adolescents to include in a valuation sample and elicitation technique requires careful consideration.

Key points for decision makers

- The use of a mixed sample of adults and adolescents to value child and adolescent health states appears feasible and may have some advantages over alternatives.
- In a mixed sample, all participants could complete the same preference elicitation task using the same perspective (for example time trade-off imagining they are living in the health state), and all preferences would be modelled to generate a combined value set that reflects both adolescent and adult preferences.
- Choices are required regarding both the relative proportion of adults and adolescents to include in a valuation sample and elicitation technique.

1 INTRODUCTION

There are at least nine child/adolescent-specific generic preference-based measures[1]: AHUM[2], AQL[3], CHU9D[4-6], EQ-5D-Y (3L[7-9] and 5L[10]), HUI2[11], HUI3[12], QWB[13], 16D[14], and 17D[15], and one for infants[16]. Across these measures there is no common approach used for valuation, with differences across the population valuing the health states, the perspective used in the preference elicitation task, and the preference elicitation technique[17]. The valuation of any preference-based measure (PBM) requires decisions around whose preferences to elicit (e.g. patients vs. general population), using which perspective (e.g. one's own vs. that of another), and choice of preference elicitation technique (e.g. time trade-off (TTO) vs. discrete choice experiment (DCE)). In addition, where the elicitation technique does not produce values on the full health-dead scale required to generate quality adjusted life years (QALYs), methods to anchor onto that scale are required. There may be good reasons to take different approaches when considering the valuation of child and adolescent health compared to the approaches used for adults. Here we define children as aged below 11, adolescents as age 11-17, and adults as age 18 and over.

Value sets for adult PBMs (for example EQ-5D and SF-6D) are typically elicited from adult members of the general population aged 18 and over[18-22]. However, the preferences for child and adolescent-specific health states used to generate value sets can be elicited from adults (members of the general public, parents, patients with comparable conditions to the child or healthcare professionals), young adults (e.g. 18-19 year olds [23]), or adolescents and children (including general public and/or patients). Different populations provide different preferences (for example [24]), and theoretical, practical and ethical arguments can be made in favour of selecting any of these populations to value child and adolescent health states. Previous research has found that children as young as 11 can provide preferences by completing best-worst scaling tasks[24, 25]. However, there is very little research that the authors are aware of involving the elicitation of preferences from younger children (rather than adolescents), though it is expected that they would have great difficulty completing valuation tasks. One study found that children aged 7 to 9 could not meaningfully complete pair-wise or best-worst scaling[26].

Where adolescent preferences have been elicited using techniques that generate latent values that are not on the full health-dead scale, these latent values have been anchored onto the full health-dead scale using young adult preferences (for example [23]). In these studies, adolescents provide the relative weightings of the dimensions and severity levels using one preference elicitation technique, and young adults anchor these onto the full health-dead scale using a different preference elicitation task (for example [23]). Some studies have elicited preferences from adolescents and adults combined for own health, and for a small number of bespoke health states. For example, one study elicited adolescent and parent (as proxy) preferences using standard gamble (SG) and visual analogue scale (VAS) for own health state and a small number of hypothetical health states[27]. Other studies have elicited direct utility values for own health across a population that includes both adolescents and adults (see for example [28]). Other studies have elicited both adolescent and adult preferences for the same measure and country, but using different approaches for adults and adolescents (see for example [29, 30] where perspective varies). However, to date, no studies have explored the use of a sample that purposively includes both adults and adolescents to elicit preferences for hypothetical health states, using the same preference elicitation tasks and perspective, to generate a value set for a PBM that reflects the values of adults and adolescents combined, despite this being a potentially attractive option. Indeed, the elicitation of preferences for all health states – child, adolescent, adult - from a mixed sample of adults and adolescents would provide consistency in the population providing preferences used to score all QALYs.

This paper provides an overview of the ethical, practical and theoretical issues, and implications arising from the use of a mixed sample of adolescents and adults to value child and adolescent health states. Discussion is separated into four sections: whose preferences; preference elicitation technique; perspective; and sampling. Table 1 summarises the issues for each of these. The use of question marks in the table indicates where this issue is unknown, and where research would contribute to a better understanding of this. Finally, recommendations are made around factors to consider when choosing the population for the valuation of child and adolescent-specific health states.

2 WHOSE PREFERENCES?

Previous research has shown that adult and adolescent preferences differ [24, 25, 30, 31], meaning that the choice of whose preferences to elicit impacts on the value set and the two are not interchangeable. There are powerful and persuasive arguments for and against the elicitation of adult and adolescent preferences to generate health state utility values for child and adolescent health states (summarised in Table 2), making it difficult to choose. An alternative novel approach to using either adult or adolescent preferences to value child and adolescent health states is to instead use a mixed sample of both adolescents and adults.

2.1 Meaningful involvement and empowerment of adolescents

Health state utility values are used to generate QALYs that impact on the availability of healthcare interventions for children and adolescents. The United Nations Convention on the Rights of the Child states that children/adolescents who are capable of forming their own views should have the right to express their views in all matters affecting them, and further that their views should be given weight in accordance with the age and maturity of the child/adolescent[32]. Some institutions emphasise the importance of involving adolescents' opinions in decisions related to their health [32-35], and there are arguments around the empowerment of adolescents to make decisions for themselves[36]. However, there may be individual differences in the extent to which adolescents themselves want to be involved in decision-making about health (see for example [37]). Furthermore, adolescents are not regarded as autonomous legal, social and economic agents by society and the government.

2.2 Adolescent understanding of elicitation tasks and health states

Adolescent understanding and ability to meaningfully complete preference elicitation tasks can be impacted by: 1) the cognitive complexity of preference elicitation tasks; 2) lack of experience and understanding around ill health; and 3) lack of psychosocial maturity.

First, preference elicitation tasks can be cognitively complex, both to understand and to make a choice. Arguably, participants' ability to both understand and choose is

affected by their educational level and intelligence rather than simply their age. Understanding can also be difficult to monitor, since valuation exercises do not have right or wrong answers. However, logical consistency checks on responses can be undertaken, and self-reported understanding data can be collected.

Second, many adolescents will not have experienced severe health states, and as such may be unable to imagine them personally (though the same argument can be made for adults). Studies have found that often participants can better imagine health states through both their own experiences of impaired health and experiences of family members [38], which would be applicable for adolescents.

Third, the capacity of adolescents to engage in societally-impactful decision-making is potentially limited, with neurobiological arguments suggesting that while a typical adolescent may possess the necessary cognitive capacity for decision-making, they may need additional support to do so when compared to a typical adult. For example, on average, adolescents are more likely to take risks[37] during decision-making than adults, which may potentially impact on preferences for some elicitation techniques. A recent study reported that adolescents' cognitive capacity reached adult levels around age 16, with psychosocial maturity (restraining oneself when exposed to emotional, exciting, or risky stimuli) in decision-making reaching adult levels beyond age 18 and not peaking until the 20s. This suggests that young adults (who are already included in valuation studies) may be as liable to decision-making biases associated with psychosocial immaturity as a sample of adolescents[39]. The extent to which levels of psychosocial maturity influence decision-making in health preference elicitation tasks, rather than emotional or time pressured decisions, has yet to be determined. However, research suggests that differences between adolescents and adults in decision-making may be less pronounced in tasks that promote more deliberative than emotional decision-making [40]. Preference elicitation tasks however may involve both deliberative and emotional decision-making, and this may differ by elicitation technique.

Appropriate framing and design could be implemented to ensure the acceptability and appropriateness of these tasks. Further research assessing adolescents' views on this directly will assist in achieving acceptability and understanding, and is likely to be

informative for ethics committees making decisions around the conduct and acceptability of these types of studies. A key consideration for approval committees is that the research will yield results that are both meaningful and useful, and is not unnecessarily burdensome. Careful design of valuation studies including consideration of formatting, framing, number of dimensions in the health states, number of preference elicitation tasks and mode of administration can all impact on whether the valuation survey will appropriately elicit utility values. Indeed, this is an issue that is important for all valuation studies and not only those involving adolescents. However, if adolescents lack experience and understanding of ill health and are not informed about health states, this issue may be difficult to overcome.

2.3 Ethical concerns around preference elicitation with adolescents

There are concerns around whether it is acceptable and appropriate to administer preference elicitation tasks due to the possibility that consideration of death or trading between quality of life and quantity of life may cause upset or distress for adolescents[41]. The existence of TTO studies that have been undertaken with adolescents using preference elicitation tasks for both their own health and/or for hypothetical health states that involve consideration of being dead (potentially framed as trading of years left to live)[42-46] suggests that these tasks may be acceptable and appropriate. However, the authors are not aware of any studies designed to explicitly test this. Given that a resolution to this issue may facilitate greater adolescent empowerment in health research, we believe it is ethically appropriate and prudent to conduct such research with adolescents if appropriately designed and conducted.

3 PREFERENCE ELICITATION TECHNIQUE

Table 3 summarises potential options (with accompanying considerations) for eliciting preferences for child and adolescent health states across different elicitation techniques and perspectives. To ensure the value set is representative of the preferences of the entire mixed sample of adolescents and adults, the same task should be undertaken by all participants. We argue for this on the basis that if different elicitation techniques are used for adolescents and adults, for example adolescents complete best-worst scaling tasks and adults complete TTO tasks, then adolescents

are not providing preferences for the location of the dimensions and severity levels of each dimension on the full health-dead scale, and hence the resultant value set does not fully indicate their preferences in this regard. However, this stance requires that adolescents must consider the location of dead in comparison to ill health. Selection of the elicitation task should take into consideration the perspective to use (see section 4).

The selection of preference elicitation task is constrained if there is a requirement that the modelled utilities are anchored onto the full health-dead scale required to generate QALYs. TTO, DCE with duration, SG, and VAS (involving a dead state) tasks meet the requirement of being able to generate utilities on the full health-dead scale, but their appropriateness and acceptability in a mixed sample can be questioned. We focus on TTO, SG and DCE with duration as they are methods that involve opportunity cost and can generate values directly onto the full health-dead scale required to generate QALYs. Concerns have been raised in the literature around the use of VAS to generate utilities, including its lack of theoretical foundations (see for example [47]), and DCE (without a duration attribute) and best-worst scaling are not considered here since they would require use of one of the other elicitation methods to generate values on the full health-dead scale [17, 48]. Evidence for TTO, SG and DCE with duration was informed by a systematic search of the literature (see supplementary materials).

SG has been used to elicit preferences from adolescents [41, 49] and to generate value sets for child and adolescent-specific PBMs based on adult preferences [11] [50, 51] [12, 52]. However, SG is rarely used in more recent studies, both for adults as well as children. This may be because the utilities that are elicited can be impacted by the participants' attitude to risk and the task itself can be cognitively complex, with particular challenges around the interpretation of changes in probability (see [47] for an overview). The SG technique has been criticised as being cognitively complex, which may mean that participants do not understand the tasks and/or accurately interpret the probabilities. In addition, the utilities that are elicited can be impacted by the participants' attitude to risk.

TTO has an advantage that it has been used in adolescent samples [28, 41, 43-46, 49, 53-63], and is widely used in adult samples. Consistency with adult measures may be important when considering the use of these values in decision models that often

extrapolate beyond childhood/adolescence. TTO has the disadvantage that utilities can incorporate temporal discounting, where respondents have greater aversion to experiencing ill health now than in the future (see [47] for an overview). Related to this, one important consideration is that typically TTO tasks use a 10 year time frame for states that are better than dead, where participants trade between 10 years in an impaired health state and 10 or fewer years in full health, and at the end of either state the participant would be dead. The plausibility of a life expectancy of 10 years from today for adolescents and younger adults is questionable (and may be implausible for many adults), and potentially this could impact on preferences (though the authors are not aware of any studies examining this). For this reason some studies have used different time frames, for example 60 years[43]. However, increasing the time frame beyond 10 years would be implausible for the elderly participants in the sample. The same criticism of implausibility of duration can be applied to all valuation studies, including studies using the DCE with duration technique that often use 10 years life expectancy.

DCE with duration has not been used in a sample of adolescents to our knowledge, and hence is not discussed further here. Qualitative research has cast doubt on the feasibility of conducting DCE (without duration) in adolescent samples[64], particularly for younger adolescents aged 11 to 13[26], though evidence from recent quantitative studies assessing EQ-5D-Y health states suggests that DCE with adolescents is feasible and produces valid latent estimates[29, 30]. Whilst the international protocol for EQ-5D-Y uses data from both DCE (without duration) and TTO collected from adults[65], we have not discussed this further here using a mixed sample. However, future discussion could explore the feasibility and appropriateness of this approach further given its traction as the international EQ-5D-Y valuation protocol.

On balance, TTO may be a promising elicitation option in a mixed sample, provided the selected age of adolescents ensure appropriateness and feasibility, and future research examining this would be beneficial.

4 PERSPECTIVE

In preference elicitation tasks for hypothetical health states, participants are asked to imagine a particular health state. The term 'perspective' is used to indicate the person whom the participant is imagining living in the health state[17].

All preference elicitation surveys undertaken with adolescents that the authors are aware of have been conducted from an 'own' perspective (i.e. imagining themselves living in the health state), which may be considered simpler than other perspectives. Many adolescent TTO studies ask respondents to only value their current health state [28, 44, 46, 49, 59-61], and some value hypothetical and current health states [62, 63]). Whilst it is unknown how perspective impacts on adolescent preference elicitation, adults and adolescents potentially differ systematically in the way they think about and make decisions for others versus themselves, with research suggesting that adolescents may be 'hard-wired' to be more selfish than adults, though this difference flattens out over time[66].

Preference elicitation tasks undertaken by adults for adult health states use an 'own' perspective. However, the respondent could be asked to imagine a (non-defined) child, or themselves as a child, for example, though emerging evidence suggests perspective impacts on elicited preferences from adults[67, 68]. When asked to imagine a child, some adults imagine a child they know, whereas others do not think of a particular child[38, 69], and ongoing research is assessing the impact of this.

One option is that adults also value states using an 'own' perspective, which has the advantage that the valuation does not specify childhood or age specifically, though will be affected by the age of the participant. However, the use of own perspective raises challenges regarding appropriate wording. Some measures, such as HUI2[11] and HUI3[12], use the same set of questions and classification system for children, adolescents and adults. Other measures, including the EQ-5D, have different child/adolescent versions to make them appropriate for younger populations, both in terms of meaning (e.g. replacing anxiety/depression with worry/sadness) and content (e.g. providing appropriate examples for usual activities). These differences can have an impact on adult valuation, for example whether anxiety/depression is the same as

worry/sadness/unhappiness, and differences in usual activities, such as the inclusion of school as a usual activity for young populations. For example, utility values differed for EQ-5D and EQ-5D-Y from adults imagining themselves living in the health state (though there were no significant differences when using the perspective of a 10 year old child)[68].

A second option is to use a child perspective for adults (see [70] for a greater discussion) where they are asked to imagine an adolescent of, say, 15 years. This could provide some consistency regarding age with the adolescent sample. However, there is a difference in adolescents imagining themselves in the health state at their current age (say of 15), and adults imagining somebody else aged 15 in the health state. Making choices on behalf of another, and that the other is a child or adolescent, may bring in considerations that are not reflected in the same way if you are making choices for yourself.

A third option is to have a range of different aged children for adults to imagine (for example age 5-7 years, 8-10 years, 11-13 years, 14-15 years), and 16 to 17 year old adolescents answer using their own perspective. This raises the same concerns as the second option, but one advantage to this option is that all ages of children (whose health could be captured using the measure) are considered, albeit from a different (own) perspective for older adolescents. However, we are not aware of published evidence demonstrating the impact of preferences on utility values elicited for different ages of children, though several ongoing studies are examining this.

On balance, it seems preferable to use own perspective throughout the sample to maintain consistency, since different perspectives generate different responses and involve different considerations for participants. However, this is not without limitations.

5 SAMPLING

If a representative sample for age was obtained and the results modelled with no sample adjustments in a valuation study for the population aged 16 and over, for example, the proportion of participants aged 16 and 17 would be small (for example this would be 3.2% in the UK from the 2011 UK census, and the same argument

applies when reducing the lower age limit to any age). This small percentage of participants would not be anticipated to have a substantial impact on the value set, and hence would not be expected to generate a value set that differs in comparison to a value set elicited from a sample of adults aged 18 and above. Arguably, this would not achieve the representation of adolescent preferences in the value set.

One option is to oversample adolescents in the valuation study, to enable adolescent preferences to impact on the value set, and this could be set, for example, at the proportion of the population below 18 years. However, there is then an issue of how to adjust or “weight” the sample, and/or the modelled value set, regarding adolescent participants relative to adults. An equal sample size of 50%/50% adolescents/adults would mean a large oversampling of adolescents, but would be a true mixed sample rather than a representative sample of the population aged above a certain age. The selection of proportions of adolescents in the sample and any sample adjustments used to generate the modelled value set is a normative decision, though this could be informed by research into the impact of the differences, as well as the views of the general public and decision makers.

6 CONCLUSIONS

The use of a mixed adolescent and adult sample to value child and adolescent health states appears feasible. It has the advantage that it includes both some of the population who can potentially experience the health states, thus enabling adolescents to express their views around matters that may affect them, and the population that are taxpayers and voters. The commentary is limited by the paucity of academic literature on this topic, yet this is an important and relevant issue, worthy of future research.

Valuation of health states from the own perspective (imagining yourself living in the health state) throughout the sample is a promising approach, but is not without limitations. The use of TTO may be advantageous, since TTO is a widely used and accepted approach in adult valuation samples and there is evidence of the requisite cognitive capacity and prior administration of TTO in participants aged under 18.

However, evidence is limited around the minimum age of adolescents where it is appropriate and feasible to use tasks such as TTO, and no study to our knowledge has purposively assessed acceptability, feasibility and framing of TTO in interviews with adolescent participants, exploring the issues by age in years, nor considered the psychosocial maturity of survey participants that will impact on their choices. Therefore, prior to undertaking such a valuation study using a mixed adolescent and adult sample, it is recommended that research purposively designed to assess the acceptability, feasibility and framing of TTO in participants aged under 18 is conducted, and that the proportion of adolescents and adults that comprise the sample and the resultant modelled value set is given careful consideration.

The use of a mixed adolescent and adult sample faces the disadvantage that there may be a discrepancy between the health state self-reported by children and adolescents and the health state that is valued (for example usual activities differ for adults, adolescents and children), and further between the health state imagined across different ages of the sample. There is also a concern that this sample still does not contain children. We have not suggested that further research is undertaken to assess whether children below age 11 can meaningfully complete preference elicitation tasks, since from the limited evidence currently available, we would not expect that this is feasible.

Utility values are used in a wide range of studies to answer a range of different research questions, and for some research questions there may be other arguments to consider around whose preferences to consider, for example if the utilities are used to inform treatment decisions for an individual patient. However, the use of a mixed sample to value both adult and adolescent health states would mean consistency in the population providing preferences used to score QALYs. This could also mean that the same preference elicitation technique, perspective, and population could be used to elicit preferences across both child/adolescent and adult measures, providing comparability in the methodological decisions used to generate value sets for use in cost-effectiveness analyses. This could enable greater consistency in the elicitation methods used to generate health state utility values that inform cost-effectiveness models across children, adolescents and adults.

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Table 1: Considerations in the valuation of child and adolescent health states

	Issues	Adults	Adolescents
Population	Tax payers and voters	✓ (although some adults will not be tax payers)	✗ (although some adolescents will be tax payers)
	Veil of ignorance (impartial and unbiased)	✓ members of the public	✓ members of the public
	Consistency with the adult population used to value adult measures	✓	✗
	Experience and understanding of the <i>health state</i>	✓ potentially for adults who experienced childhood illness	✓ for patients
	Understanding the impact of the health state on the lives of children	? Questionable, though parents may have better understanding	? Questionable, though may differ by health and life experiences
	Understanding the impact of the health state on the lives of adolescents	? Questionable, though parents may have better understanding	? Questionable, though may differ by health and life experiences
	Empowerment of adolescents	✗	✓
	Capacity of decision-making	✓	? Questionable whether all adolescents have the psychosocial maturity that enables important decision-making
	Legal age for full participation in political and life events e.g. voting, marriage	✓	✗
	Responsible for other decisions around their own health	✓	? Likely to differ by age and between individuals
Perspective	Consistency with child/adolescent descriptions of health	✓ when using child perspective ✗ when using own perspective (though could be consistent for some measures or dimensions)	✓ when using own or child perspective
	Consistency with adult valuation perspective of own health	✓ when using own perspective ✗ when using child perspective	✓ when using own perspective ✗ when using child perspective
Preference elicitation task	Ease of understanding the task	✓ TTO, BWS, DCE, VAS	✓ BWS ? DCE, VAS, TTO

	Issues	Adults	Adolescents
	Ease of completing the task	✓ TTO, BWS, DCE, VAS	✓ BWS ? DCE, VAS, TTO
	Able to generate relative importance of dimensions and severity levels	✓	✓
	Able to anchor values onto 1-0 full health-dead scale	✓	?
	Appropriateness of including dead in valuation tasks	✓	?
	Bias related to perspective	? potentially when using an other perspective	×
Sampling/weighting results	Proportion of the general population	Large	Small (very small if aged 16-17 years)

Notes: ✓=yes, ×=no, ?=unknown (or there may be conflicting evidence), TTO= time trade-off, BWS=best-worst scaling, DCE=discrete choice experiment, VAS=visual analogue scale.

Table 2: Arguments for and against the exclusive elicitation of adult or adolescent preferences for child and adolescent health states

	Adults	Adolescents
For	<ul style="list-style-type: none"> • Tax payers and eligible to vote • Consistency with the adult population used to value adult measures • Capacity to make decisions and legal age for other important decisions • No ethical concerns around the administration of tasks mentioning death or trading life years • Potential understanding of how ill health impacts on the lives of children and as they progress into adulthood (using child perspective) • Veil of ignorance (impartial and unbiased when using own perspective since do not have a vested interest) 	<ul style="list-style-type: none"> • Potential understanding of impact of health state on lives of adolescents (though questionable whether understand impact for children) • Veil of ignorance (impartial and unbiased) • Empowerment of adolescents (though can be argued this may not be a relevant consideration in this context) • Consistent with the United Nations Convention on the Rights of the Child, 1989 stating that the views of a child should be given weight in accordance with their age and maturity[32] • Age group that the preference-based measure is intended for (though the measures are also intended for use in children) • Age group that are impacted by resource allocation decisions informed by the elicited preferences (though the decisions will also impact children)
Against	<ul style="list-style-type: none"> • Do not fully understand the health state as experienced by children and adolescents • May not be impartial or unbiased when valuing health states that are framed as experienced by children and adolescents (i.e. using a child perspective) as may have a vested interest (e.g. may be the parent of the child) and/or reasoning may be emotive • May find it difficult to imagine the health of a child or adolescent (if asked to value health states using a child perspective) 	<ul style="list-style-type: none"> • Adolescents are not regarded as autonomous legal, social and economic agents by society and the government. For example, adolescents are unable to vote Ethical concerns are often raised around the administration of tasks mentioning death or trading life years (particularly in younger adolescents) • May not have the psychosocial maturity to meaningfully complete preference elicitation tasks • May not be able to understand more cognitively challenging tasks (this will differ by age and the individual) • May not be able to imagine themselves in ill health (this will differ by age and the individual)

Table 3: Considerations and study characteristics for eliciting preferences for child and adolescent health states

Sample	Perspective	Method	Notes
Adult	Own	TTO	<ul style="list-style-type: none"> Wording changes may be required to make states applicable to adults
		DCE with duration	
		Standard gamble	
		DCE	<ul style="list-style-type: none"> Wording changes may be required to make states applicable to adults Not choice-based tasks that involve a sacrifice, for example in terms of years of life or risk of death (note that DCE involves a trade-off across health profiles) Typically require data elicited using another preference elicitation task to anchor onto the 1-0 full health-dead scale
		VAS	
		Ranking	
		BWS	
	Child[67, 68]	TTO	<ul style="list-style-type: none"> Evidence showing participants find this more difficult than use of an own perspective, and that the child who is imagined varies across respondents (e.g. own child, no particular child)[69, 71]. Research is ongoing around the impact of whose child is imagined.
		DCE with duration	
		Standard gamble	
		DCE	<ul style="list-style-type: none"> Not choice-based tasks that involve a sacrifice (see explanation above) Typically require data elicited using another preference elicitation task to anchor onto the 1-0 full health-dead scale
		VAS	
		Ranking	
		BWS	
Adolescent	Own	TTO	<ul style="list-style-type: none"> Ethical concerns around consideration of death and trading of life years
		DCE with duration	
		Standard gamble	<ul style="list-style-type: none"> Ethical concerns around consideration of death and risk of death Concerns around understanding of probabilities

Sample	Perspective	Method	Notes
		DCE	<ul style="list-style-type: none"> • Not choice-based tasks that involve a sacrifice (see explanation above) • Typically require data elicited using another preference elicitation task to anchor onto the 1-0 full health-dead scale
		VAS	
		Ranking	
		BWS	
	Child	All	<ul style="list-style-type: none"> • No research examining the elicitation of adolescent preferences using a child perspective
Mixed sample of adolescents and adults	Own	TTO	<ul style="list-style-type: none"> • Wording changes may be required to make states applicable to adults. • Ethical concerns around consideration of death and trading of life years for adolescents
		DCE with duration	
		Standard gamble	<ul style="list-style-type: none"> • Wording changes may be required to make states applicable to adults • Ethical concerns around consideration of death and risk of death for adolescents • Concerns around understanding of probabilities
		DCE	<ul style="list-style-type: none"> • Wording changes may be required to make states applicable to adults • Not choice-based tasks that involve a sacrifice (see explanation above) • Typically require data elicited using another preference elicitation task to anchor onto the 1-0 full health-dead scale
	VAS		
	Ranking		
	BWS		
	Child	All	<ul style="list-style-type: none"> • Evidence showing adults find this more difficult than use of an own perspective, and that the child who is imagined varies across respondents (e.g. own child, no particular child)[71, 72]. Research is ongoing around the impact of whose child is imagined. • No research examining the elicitation of adolescent preferences using a child perspective

Notes: BWS: best-worst scaling; DCE: discrete choice experiment; VAS: visual analogue scale.