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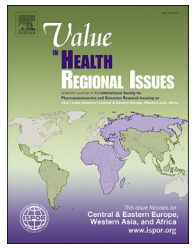

Methodology

Valuing Health States in Russia: A First Feasibility Study

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ABSTRACT

Objective: The aim of this study was to explore the feasibility of different health-related quality-of-life valuation methods in a new setting. Based on a small feasibility study of 100 young Russians, we trialed different methodologies and identified key differences that have implications for the development of health technology assessment in Russia. **Methods:** In face-to-face interviews, respondents completed a series of health self-assessments based on a modified version of the EQ-5D-3L, visual analogue scale, time tradeoff, standard gamble, and best–worst scaling methodologies, covering actual and hypothetical health states. **Results:** We found that (1) the visual analogue scale produced lower health valuations and fewer logical inconsistencies than either time trade-off or standard gamble methodologies; (2) initial health states can be decisive in determining values assigned to health improvements; (3) respondents evaluate abstract health states more positively than their own actual health states; (4) there is evidence consistent with the hypothesis that actual and hypothetical health state valuation, using EQ-5D-3L, is an artifact of understanding rather than preference and that the incorporation of additional levels may therefore be no panacea if the dimensions themselves overlook important attributes; and (5) the country context is important in determining how respondents relate to the survey tools and how those survey tools are translated and delivered. **Conclusions:** Russia is commencing its health technology assessment journey and should proceed cautiously as it moves toward the valuation of health benefits. These results suggest a useful framework for a more in-depth development of health valuation methodologies in Russia.

Keywords: EQ-5D, health measurement, health-related quality of life, health state valuation, preference elicitation, Russia, standard gamble, time trade-off

Introduction

The Russian healthcare system has undergone a radical transformation since the collapse of the Soviet Union, but its modernization into a more decentralized, insurance-based system remains substantially incomplete. A recent Bloomberg assessment ranked Russian healthcare last from 55 developed countries based on the efficiency of its healthcare system.[1] A combination of population aging, improved disease management, public health campaigns, new technologies, and pharmaceutical innovations are further increasing the financial burden on the healthcare system, which receives as little as 3.3% to 3.6% of GDP through government spending.[2] Russia is a laggard in embracing decision-making approaches and technologies in health resource allocation that incorporate the full range of stakeholders. Whereas much of the rest of the developed world now routinely measures the costs and benefits of interventions within the framework of Health Technology Assessment (HTA), Russian health policy is rarely based on scientifically generated empirical evidence.

Moving to an evidence-based system is complex in any country setting, but nowhere more so than in the institutional settings of the former Soviet Union, where the long-embedded and often contradictory interests of the stakeholders involved necessitate a careful and gradual evolution of reforms. In Russia, there has been a steady impetus toward the development of an evidence-based approach. In 2012, major reforms were initiated that have given rise to the introduction of a Diagnosis Related Group system along with attempts at incorporating HTA (for medicine) into Russian laws. In 2015, the Ministry of Health established a Center for Healthcare Quality Assessment and Control, which serves as the main official agency in Russia charged with delivering improved processes, guidelines, transparency, and public education to the field of healthcare decision making.

Conflict of interest: The authors have indicated that they have no conflicts of interest with regard to the content of this article.

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Encouraging though this progress is, it represents only a start. Although HTA now has a formal place in healthcare development strategies, the scholarly research and the associated knowledge exchange networks that connect providers, payers, policy makers, the healthcare industry, health economists, and patients remain underdeveloped. There are a cluster of research teams from the health sector that have engaged in medical technology assessments for drugs and therapeutic interventions[3] and a small number of health economists undertaking economic and cost-based evaluations in treatment and screening,[4–6] but demand from policy makers remains low because there is little knowledge of how to use economic evaluations. There are also growing numbers of studies[7–11] that use health-related quality of life (HRQoL) instruments, such as EQ-5D, in specific clinical settings (eg, musculoskeletal and cardiovascular), but there has been no primary research comparing health valuation methods in Russia and only nascent attempts at establishing population norms for EQ-5D,[10] and so the prospects for incorporating HRQoL into HTA for evaluating interventions remain distant.

Russia is not alone in beginning the transformation to value-based healthcare. The early experiences of similar countries, in exploring valuation methods, are generating important lessons relating to evaluation techniques and the decisive role—in shaping the values that emerge—of culture, society, and religion.[12,13] These lessons highlight the importance for Russia and other countries of exploring the various possible approaches and methods in the context of their own populations, norms, and cultures and the evolving scientific consensus. This article provides a first attempt at exploring such approaches in the context of Russia by addressing 2 main questions: (1) How consistent are Russian respondents in evaluating actual and hypothetical health outcomes? (2) How can health outcome methodologies be effectively implemented in Russia?

Methods

Of the numerous obstacles to the effective adoption of HTA, the measurement and valuation of the benefits associated with healthcare interventions is perhaps the most challenging. Accurate evaluation of these benefits and how they pertain to HRQoL is a requirement if HTA is to usefully influence funding, pricing, and reimbursement decisions in Russia.[14] The European quality of life 5-dimension (EQ-5D) survey tool, translated into a wide range of languages through a standardized protocol,[15] is one of the principal instruments for measuring health benefits, allowing comparisons over time and across morbidity groups, without relying on incompatible clinical outcome measures.[16] It takes the form of a descriptive system comprising 5 dimensions (mobility, self-care, usual activities, pain or discomfort, and anxiety or depression), which are rated over either 3 levels (EQ-5D-3L) or 5 levels (EQ-5D-5L), giving rise respectively to 243 or 3125 unique health states. The utility-based "value-sets" that accompany these methods provide population-based judgments, ranging from 0 (dead) to 1 (full health), for each EQ-5D health state. These judgments are ideally obtained from the population using the so-called stated preference methods, such as time trade-off (TTO) or standard gamble (SG), or can be indirectly interpreted (from the sample population) through the visual analogue scale (VAS) that forms part of the EQ-5D self-assessment.[17] In the latter case, respondents situate their described health on a line between 0 (worst imaginable) and 1 (best imaginable), whereas in the former case, respondents effectively trade-off between length of life and quality of life. It is now well-known that different elicitation methods can yield different values[18,19] and that these values can vary within and across countries according to cultural beliefs, the availability of healthcare, and the structure of social institutions, but little is known about how these factors play out in the Russian context.

To explore the viability of different HRQoL approaches, we conducted a feasibility study, by interviewing a convenience sample of 100 Russian students (age 18-40 years) in 2 city campuses (Moscow and St. Petersburg) of the National Research University Higher School of Economics (HSE). The respondents were invited to a computer-assisted interview (in Russian) that would last no more than 1 hour, during which they were asked to provide sociodemographic data and respond to a series of questions concerning different health scenarios. The interview comprised 6 components: (1) background questions; (2) EQ-5D-3L; (3) VAS; (4) best-worst scaling (BWS); (5) SG (interchanged with); and (6) TTO. For all 3 preference elicitation methods (VAS, SG, and TTO), we used variants measuring preferences for health states better than dead.

The first section included a standard set of questions, adapted for our student-based sample, concerning sex, age, health status, financial situation, and marital status. In the second section, respondents were asked to evaluate their current health status according to EQ-5D-3L. Drawing on earlier studies,[20] respondents were then asked to evaluate, using the VAS, 6 hypothetical EQ-5D health states (11122, 22222, 21222, 33333, 21232, 11111), selected to include the best and worst states, along with the most common states from the 2005 Russian Longitudinal Monitoring Survey, which collected partial population data based on versions of the 5 dimensions.[21] We then used the BWS method to examine the respondents' consistency and logic when making judgments about their health.[22,23] By identifying the best and worst health dimension in the first 5 hypothetical states listed above, we can establish the relative importance of the different dimensions and spot inconsistencies in the logic applied.

Finally, the respondents were asked to evaluate the same 5 states using the stated preference methods of TTO and SG. We adapted the classical "props" (board-based) method into an Excel-based computer-assisted variant in which, for SG, the probability and evaluated health states were adjusted until the respondent indicated equivalence and, for TTO, the health states and their associated life expectancies were adjusted until the respondent indicated indifference between a given time in full health and the time spent in each state. To attenuate any bias arising from the order in which TTO and SG were administered, we alternated them in delivery.

Before commencing the study, we piloted the various tools in a focus group setting, where it became clear that there were inconsistencies in the official Russian translation of the EQ-5D-3L. Through further consultation with 2 certified English-Russian translators, we introduced minor changes to the wording of the questions and so used a very close linguistic variant of the official EQ-5D instrument. We have since been in communication with the EuroQoL group concerning the translations and they have agreed on changes to be incorporated in future official translations of the EQ-5D tools.

Results

Our (nonrepresentative) sample was 56% male and drawn from diverse disciplinary degree programs, and 64% were aged 18-22 years, with the remainder being 40 or younger and the mean age being 21.7. The largest proportion (49%) were nonworking students living in student accommodation (39%) or with parents (38%), of whom 98% considered themselves to be from average- or lower-income backgrounds, and 65% reported their health as "good." The EQ-5D-3L self-evaluations show that 48% of respondents (57% of men and 36% of women) indicated a "full" health state of "11111," corresponding to an average VAS of 84.

Table 1 – Descriptive statistics for health state valuation instruments (VAS, TTO, SG).

Health state	21232	33333	21222	22222	11122	11111
Mean (standard deviation)						
VAS	29.35 (13.95)	6.05 (7.43)	47.49 (13.66)	39.24 (15.30)	66.60 (12.86)	95.06 (6.34)
TTO	42.45 (31.90)	11.40 (23.53)	68.20 (25.52)	61.85 (26.91)	87.70 (15.23)	NA
SG	39.79 (27.97)	11.55 (19.29)	68.34 (21.65)	63.31 (22.85)	88.82 (16.98)	NA
Min-max						
VAS	0-70	0-30	0-75	0-70	0-92	69-100
TTO	0-100	0-100	5-100	5-100	35-100	NA
SG	0-100	0-89.5	0.5-100	0.5-100	0.5-100	NA
Skewness						
VAS	0.70	1.43	−.69	−.11	−1.44	−1.47
TTO	.31	2.68	−.56	−.25	−1.47	
SG	.00	2.19	−.77	−.68	2.93	
Kurtosis						
VAS	6.22	−0.40	2.38	1.37	1.48	0.45
TTO	−1.17	6.83	−.62	−.99	1.66	
SG	−1.15	4.42	.75	.30	9.96	

SG indicates standard gamble; TTO, time trade-off; VAS, visual analogue scale.

A further 42%, indicating that they have 1 or 2 moderate problems (32% of females noted moderate depression in combination with no other problems), were associated with VAS scores ranging from 70 to 77. The remaining 10%, with poorer health, reported VAS scores ranging from 40 to 76. The mean VAS score for those reporting "good" health in the general questionnaire is 83.1 versus 69.5 for those reporting "bad" health.

The descriptive statistics for the results of the health state valuation technologies (VAS, TTO, and SG) are presented in Table 1. It is immediately striking that, although the mean TTO and SG scores are similar, VAS provides significantly lower evaluations, by more than 20 points in some cases, for each health state. The main difference in values moving between health states is between 33333 and 21232: the VAS score for the latter is 23.3 higher; for TTO is 31.1 higher; and for SG is 28.2 higher. The reported variances are high, particularly for the TTO. Exploring the strength of the relationship between the 3 methods using nonparametric correlation tests (Spearman's rho and Kendall's tau), we found no evidence of a relationship between TTO–SG and VAS but found evidence of a weak positive relationship between SG and TTO. Kruskal-Wallis tests confirmed that the differences observed between the 3 methods are statistically significant at conventional 5% levels.

Figure 1 captures the systematic pairwise differences between the different methods. The mean score differences between VAS and other methods are high and almost identical. For VAS–TTO the mean difference is −16.57, whereas for VAS–SG it is −16.61. The comparison of TTO–SG with VAS–TTO and VAS–SG suggests that VAS tends to collate "middle" values, whereas TTO and SG are more skewed to lower or higher values. In part, these higher (or lower) values, including the outliers, reflect the individual's attitude to risk as much as they reflect the valuation of health outcomes.

Having established large statistically significant differences in the results stemming from the 3 tools, we then explored the relative importance of the different dimensions using BWS. Table 2 presents the standardized scores, calculated as the difference between the frequency of being chosen as the most and least preferred attributes in each state, divided by the number of respondents. The score indicates the mean relative influence of each attribute. The first column (21232), with a single dominant positive and negative dimension, provides a trivial example confirming that "self-care" is the dominant positive attribute and "pain/discomfort" the dominant negative attribute. The other 4 states are more instructive. In the case of moderate problems with health (11122), "usual activities" is the dominant positive attribute, whereas "pain/discomfort" is the dominant negative attribute. As health deteriorates (21222), "self-care" is the only remaining positive dimension, but interestingly, "usual activities" becomes the dominant negative attribute. As health then deteriorates further (22222), to consistently moderate levels of ill-health, the discrepancies obviously even out and there is no dominant negative attribute, although "anxiety/depression" seems to assume a greater positive role. Finally, as we allow health to deteriorate evenly across the dimensions (33333), "mobility" and, to a lesser extent, "pain/discomfort" become more important as negative attributes, whereas "anxiety/depression" retains its role as the most important positive attribute. Although based on only 5 health states, the overall analysis of BWS suggests that individuals understood the interview task and valued health states consistently, with only 4 respondents not altering their choice of the least favorable health dimension when other dimension scores changed.

Finally, our survey was designed specifically to identify possible inconsistencies in the responses and the underlying reasoning for them. First, the ordinal structure of the health dimensions presumes that some health states are logically preferred to others (eg, 11122 should be strictly preferred to 21222). Pairwise comparisons of these cases show that, in the case of VAS, only 1% of comparisons breach the logic, whereas for SG and TTO this percentage reaches 14% and 13%, respectively. Second, our survey allows us to compare health states from the self-reported EQ-5D results with the corresponding states in the abstract VAS evaluation. We find that the respondents tend to evaluate hypothetical health states more favorably than their actual perceived health states. For example, the assessment of the "11111" (21222) health state is higher by 10 (13) points in the abstract evaluation. Third, we conducted the Mann-Whitney test to confirm that there was no substantive impact on the results of the order in which respondents undertook the SG and TTO sections of the survey. Finally, we asked respondents about their familiarity with long-standing illness and confirmed the hypothesis that those with higher levels of awareness tend to rate their own health less positively.

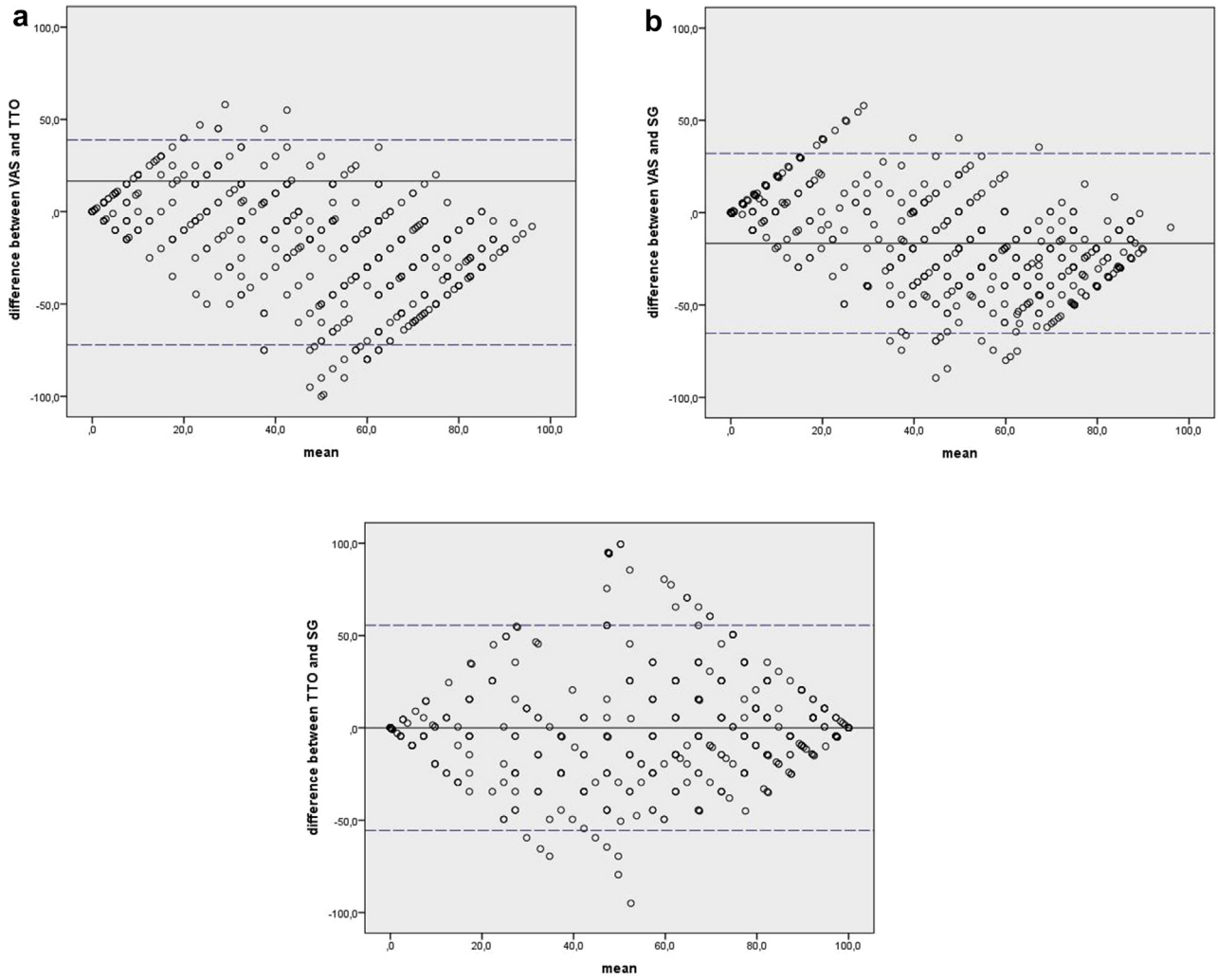

Fig. 1 – Pairwise differences (VAS, TTO, SG). SG indicates standard gamble; TTO, time trade-off; VAS, visual analogue scale.

Discussion

This feasibility study set out to provide the first systematic exploration in Russia of standard preference elicitation methods used for obtaining health state valuations. We find that, even within a relatively homogenous population subgroup, the choice of health elicitation methods has substantive effects on the valuation of both actual and hypothetical health states and that respondents in our sample appear to process and understand the instruments in cognitively distinct ways. Our findings are consistent with closely related studies. A recent Korean study[24] found large differences in the utility scores between SG/TTO and VAS and much narrower differences between SG and TTO. In our research we find no substantive difference between SG and TTO scores, which contrasts with much of the literature and is plausibly because of our use of the TTO variant that excludes health states worse than death.[12,24,25] It is, however, also likely that the homogenous and highly educated nature of our sample served to diminish the difference between SG and TTO and that, among the general population less familiar with risk concepts, a gap would emerge more in line with other studies. A Slovenian study,[26] also drawing on a sample of university students, found VAS scores of 79 ± 15, compared with our findings of 78.3 ± 12.5. A Moscow-based Russian study, working with an older population, cites a provisional VAS score of 75.4.[10]

The Slovenian study contends that psychological factors are more important than physical factors among young respondents

Table 2 – Standardized results from BWS.

Attribute	Assessed health states				
	21232	11122	21222	22222	33333
Mobility	−0.06	0.18	−0.15	0.14	**−0.56**
Self-care	**0.88**	0.17	**0.89**	−0.13	0.18
Usual activities	−0.04	**0.62**	**−0.40**	−0.15	0.24
Pain/discomfort	**−0.69**	**−0.61**	−0.23	−0.14	−0.15
Anxiety/depression	−0.09	−0.35	−0.11	**0.28**	**0.29**

Bold numbers refer to the dominant attributes for each health state.
BWS indicates best-worst scaling.

but that this is likely to be different among older cohorts. We argue that these claims could be more nuanced still. For example, our respondents tended to have a higher marginal change moving from "full-health" (11111) to "full-health" plus moderate "depression/anxiety" (11112), rather than to "full-health" plus moderate "pain/discomfort" (11121), suggesting that psychological factors do indeed dominate. Nevertheless, our BWS analysis makes very clear that respondents evaluate negative physical dimensions much more strongly than negative psychological dimensions, suggesting that to understand the value added of health interventions, consideration of the initial health state must be required.

It is often argued that the 245 health states offered by the EQ-5D-3L are sufficient for any health measurement exercise because typical surveys rarely use even half of these states. Nevertheless, discussions with our respondents raised separate concerns with using this 3-level description method because it became clear that there were very different views on the severity of the worst state (33333). Notably, some respondents remarked that many routine functions (eg, computing, social media, gaming, audiovisual entertainment) would still be possible and that therefore there are many states worse than "33333." In contrast, other respondents commented on the severely disabling nature of this state and compared it unfavorably with death as an alternative state. This highlights 2 issues. First, using EQ-5D-3L to value health may produce results that are an artifact of the understanding of the different states (eg, "33333" as severely disabling or alternatively as an inconvenience, but one which allows for substantive routine function) rather than of the underlying preferences or values. Second, although the 5-level version of the EQ-5D might attenuate some of the bias by providing for more subtle gradations in health states, the impact of changes in the health dimensions themselves may not be well understood, particularly by the younger population with their distinctive discounting of time.

In a similar vein, our study also explored the perceived difficulty that respondents had in understanding the different methodologies. Unsurprisingly, respondents overwhelmingly reported that the VAS was an easier to understand method than the TTO or SG, which were both considered difficult. A study of the Asian population in Singapore[27] explored in more detail the factors influencing individuals' preferences between the SG and TTO methods, finding only limited evidence that demographic factors determined the preference. Nevertheless, our results draw attention to the fact that choosing an elicitation methodology also requires us to account for the fact that our own health state values differ from hypothetical health state values for many reasons.[20]

Consistent with the literature, the results from these different valuation approaches suggest that the method chosen is itself important and that the framing of questions can have a significant effect on respondents' reported health state preferences.[28,29] VAS, which is not a choice-based method designed to extract individuals' utility directly, generates lower values than direct utility elicitation methods (eg, TTO and SG) because of well-known scaling biases inherent in this type of rating-based approach.[30] In theory, these choice-based methods have advantages over rating-type approaches because, in reflecting lifetime experience choices based around evaluating perceived risks rather than simple numerical ratings, they are conceptually more correct and directly extract individual utilities.[31] The VAS rating scale represents a preference-based method but lacks the equivalent conceptual richness and does not reflect how people actually form their preferences. So, although VAS—as part of the EQ-5D—is cheap and easy to administer, it should ideally be used in parallel with a choice-based utility elicitation method that takes into account the population context and characteristics.[32–34]

Like all studies, ours has limitations. Most important of all, being a feasibility study, the sample is neither representative of the population nor large enough to do more than draw initial and preliminary conclusions. Related to this, the homogeneity of our sample does not allow us to tease out subtle differences in the way people interact with the complex SG and TTO methods. Our study was also constrained by the small number of health states we could plausibly interrogate with the elicitation methodologies. Finally, as in many studies, we were not able to evaluate the health state worse than death. Notwithstanding these limitations, our feasibility study suggests some important results that should be explored more fully in a scaled-up study.

Conclusions

As resource constraints in healthcare delivery become ever more binding, embracing evidence-based decision-making approaches, such as those defined by the framework of HTA, becomes more significant in all countries. Russia is in the early stages of its engagement with HTA, and efforts to spread the principles of evidence-based healthcare require continued support from and engagement with the international academy and enhanced communication between national and regional stakeholders. Although the previous legislative changes embracing HTA (eg, Law No. 429-FZ was signed on December 22, 2014) ultimately need to be expanded beyond the field of medicine, it is more urgently incumbent on the academic and industrial sectors to develop the collaborative expertise necessary to build a Russian science base in health economic evaluation that can provide the appropriate support to organizations, such as the Center for Healthcare Quality Assessment and Control, which are currently steering HTA efforts in Russia.

A central component of the required evidence base concerns the correct measurement and valuation of health outcomes. Although HRQoL data are often collected in Russia, there has been no systematic attempt to value health states; the data are not widely used for informing intervention decisions; and little is known about the attitudes of the Russian population to such approaches. In this feasibility study we describe the results from our survey of different measurement tools and preference elicitation methodologies, including EQ-5D-3L, VAS, TTO, SG, and BWS. We make several important claims relevant both to Russia, as it develops its HTA framework, and to the wider literature addressing these methodologies and approaches.

First, concerning VAS, TTO, and SG, we find strong evidence, consistent with that widely reported in the literature, that VAS produces significantly lower health valuations than either TTO or SG. This may reflect our findings that VAS is the easiest of these methods to understand and so produces the fewest logical inconsistencies or may reflect the earlier discussion that VAS is not a direct utility elicitation method. Either way, our sample is a relatively sophisticated one in terms of understanding complex probability, risk, and tradeoff-based choices, and, in view of this, we note that the systematic differences we observe in the assessment methods should be considered when adopting techniques of preference elicitation in Russia. Future studies should also trial other ordinal preference elicitation methods, including discrete choice experiments. Second, regarding BWS, our results show that, in considering the value of health improvements, an individual's initial health state can prove decisive. For example, one "unit" moves away from the severe "mobility" or "pain/discomfort" states is likely to be of considerably more value to the individual than equivalent one unit improvements from the corresponding moderate conditions. Third, in terms of EQ-5D-3L, both the dimensions and the levels require careful consideration. Our results suggest that using the 3-level version may produce health values that stem from

understanding rather than preference and that although increasing the number of levels may attenuate this effect, the dimensions themselves may miss important attributes of health-related life quality. In addition, the country context, including as it pertains to language, is crucial. Finally, our study confirms that who is asked and what they are asked is important: Individuals in our sample consistently value abstract health states above actual health states, suggesting either that people may overestimate their own health state within the dimensions or that they adapt to their health experiences in ways that they overlook when making hypothetical health assessments.

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