Mapi Research Trust

Webinar Summary Report - Authors' interview

Patient Reported Outcome Assessments: Spotlight on the Quality of Life General (QGEN®) Survey, a one-minute alternative to the SF-36

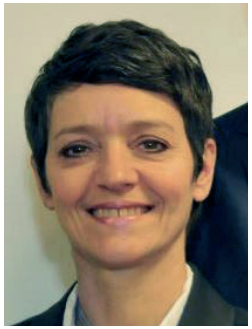
In this webinar, the featured speaker, John Ware, developer of the SF-36, explained how the new 1-minute QGEN survey was developed and evaluated as a more efficient alternative to common SF-36, PROMIS and SF-8 measures, and how it was normed in a US probability sample of adults in 2020. Findings show that, while maintaining equivalent validity and average scores for common domains, QGEN items increase the range of measurement enough to reduce ceiling effects for the dual purposes of monitoring group outcomes and screening for low levels of functional health and well-being.

This interview report summarizes the highlights and questions raised during the webinar organised by Mapi Research Trust, held on 30 September 2020.
https://xtalks.com/webinars/patient-reported-outcome-assessments-spotlight-on-the-qol-general-qgen-1-minute-alternative-to-sf-36/

About the speakers

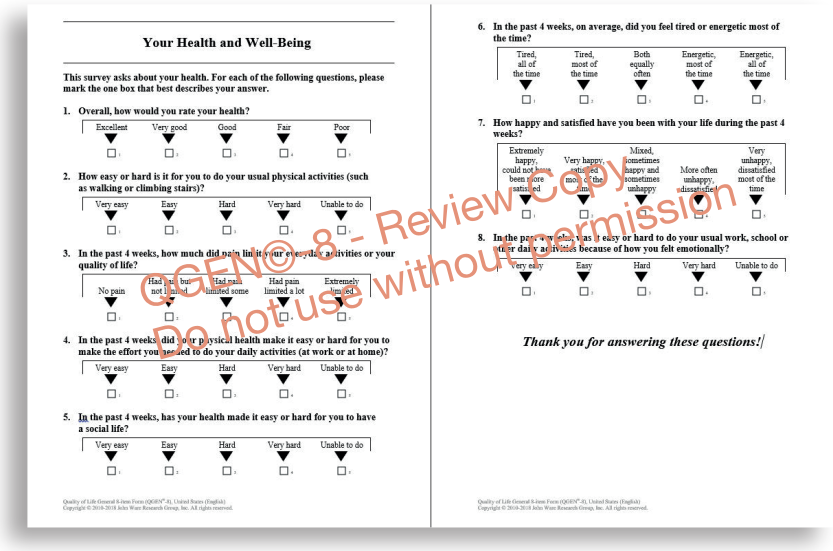
John E. Ware, Jr., PhD

is the Chief Science Officer at John Ware Research Group, Research Professor at the Department of Medicine at Tufts University School of Medicine and Visiting Professor at the College of Health Solutions at Arizona State University.
He is an internationally recognized PRO expert and elected member of the National Academy of Medicine. He led the development of the outcome measures used in the RAND Health Insurance Experiment, served as the principal investigator for the Medical Outcomes Trust (MOT) and led the International Quality of Life Assessment (IQOLA) Project translations of the SF-36 for use in multinational clinical trials and population health surveys. He founded Quality Metric to develop web-based PROs and served as its CEO and SCO for 10 years. John has also been a valued member of MRT's Scientific Advisory Team since the mid-1990s.



Marie-Pierre Emery, MSc

is Senior Project Manager at the Mapi Research Trust (MRT) Author Collaboration Unit. She has been working in the field of Patient-Reported Outcomes (PRO) and Clinical Outcomes Assessments (COA) within the non-profit MRT for 25 years and developed and contributed to the success of all PRO and COA information services provided by the organisation.



Your Health and Well-Being

This survey asks about your health. For each of the following questions, please mark the one box that best describes your answer.

1. Overall, how would you rate your health?
   Excellent | Very good | Good | Fair | Poor
2. How easy or hard is it for you to do your usual physical activities (such as walking or climbing stairs)?
   Very easy | Easy | Hard | Very hard | Unable to do
3. In the past 4 weeks, how much did pain limit your usual activities or your quality of life?
   No pain | Had pain but not limited | Had pain limited some | Had pain limited a lot | Extremely limited
4. In the past 4 weeks, did your physical health make it easy or hard for you to make the effort you needed to do your daily activities (at work or at home)?
   Very easy | Easy | Hard | Very hard | Unable to do
5. In the past 4 weeks, has your health made it easy or hard for you to have a social life?
   Very easy | Easy | Hard | Very hard | Unable to do
6. In the past 4 weeks, on average, did you feel tired or energetic most of the time?
   Tired, all of the time | Tired, most of the time | Both equally often | Energetic, most of the time | Energetic, all of the time
7. How happy and satisfied have you been with your life during the past 4 weeks?
   Extremely happy, could not have been more satisfied | Very happy, satisfied most of the time | Mixed, sometimes happy and sometimes unhappy | More often unhappy, dissatisfied | Very unhappy, dissatisfied most of the time
8. In the past 4 weeks, was it easy or hard to do your usual work, school or other daily activities because of how you felt emotionally?
   Very easy | Easy | Hard | Very hard | Unable to do

Thank you for answering these questions!

QGEN® was developed by John Ware Research Group (JWRG) and is a short single-item-per-domain (SIPD) way of estimating the 8 general health domains and summary scores most frequently measured using Medical Outcomes Study short-form surveys. It can be used in static format (QGEN®-8 and QGEN®-10) and as the first question for each domain in computerized adaptive testing (QGEN®-CAT). The two additional domains measured in QGEN®-10 and QGEN®-CAT will be discussed below.

On 30 September 2020, Mapi Research Trust (MRT) hosted a 110-participant webinar during which the author, Dr John E. Ware Jr, explained the reasons for developing QGEN®, how it was developed, how it relates to legacy measures, the advantages of using QGEN® and perspectives for further research. Marie-Pierre Emery of MRT, the official distributor of QGEN®, provided an overview of the available translations, how to access both original and its language versions and their conditions of use.

MRT: *Thank you both for the informative presentations during the webinar. John, you said it was important to understand the development of QGEN® in the historical context of general health-related quality of life (QOL) measurement. Could you provide an overview of how you see its evolution?*

JW: Over the past 50 years, yes, it has been that long - I think of it as the psychometric era during which surveys evolved from opinion polls to instruments for measuring health and QOL - we progressed from simple "Yes/No" questions to items with multiple ordered response categories and from surveying disability and distress to measuring functioning and well-being.

Relatively long surveys allowed us to better understand what health-related QOL is and how best to capture and quantify it. My outcomes development work was done in a large 5-year randomized groups health insurance experiment (RAND HIE)[1] in the US population and was followed by a large 4-year observational, medical outcomes study (MOS)[2] of the chronically ill. The tools proven useful in these studies were adopted in research but they were too long for widespread usage in population surveys and for measuring and improving health care outcomes. So, we made them shorter. The original 149-item MOS Survey was the basis for reducing and improving items in the 36-item MOS SF-36 and it became the most widely used health survey. While measuring the same 8 domains and physical and mental summary outcomes, it was further condensed to 12 and 8 items, respectively, the SF-12 and SF-8. Another noteworthy landmark was the translation of the SF-36 pursuant to the industry-sponsored International Quality of Life Assessment (IQOLA) Project[3]. Discoveries of item improvements during the translation process led to the development of SF-36v2, which I referred to as the "international version".[4]

MRT: *So, you continued to shorten the original 149-item MOS survey. What was the rationale for developing yet another 8-item measure with the QGEN®?*

JW: QGEN® is a great grandchild of the HIE and MOS tools, including their reduced versions which became widely used because they were short and provided information about important outcomes. In terms of the minimum number of core (essential) domains measured, QGEN® is not shorter. Its items, as the first survey question were improved to allow the measurement of each domain over a wider range. Each item assesses (a) the higher levels of functioning and well-being that most people in the general population enjoy and (b) the lower levels of ill-being and disability experienced when we are not well. QGEN® appears to capture this wider range better than previous tools.

QGEN® got its name to distinguish it from the Quality of Life Disease Impact Scale (QDIS®)[5], which is a disease-specific scale with the comprehensiveness comparable to general QOL tools. Both tools should and are being used together as core short-forms for comprehensively capturing both general (QGEN®) and disease-specific (QDIS®) outcomes.

MRT: *What were the steps involved in the development of QGEN®?*

JW: I have been thinking about how to further improve items for about 30 years. Our active work and testing have been in progress for about 10 years and some pieces of the puzzle have been published. In summary the process has been: (a) identify and operationally define the core domains (most frequently measured across 40 years of published tools and results); (b) match the best approaches (from literature or new tests) with methods for capturing the essence of each domain; (c) evaluate hypothesized improvements by comparing new candidate and legacy items on a domain-by-domain basis; (d) if necessary because what may be the best approach is not "off the shelf", construct new questions. We had to do the latter for two domains: Vitality (VT) and Mental Health (MH), and (e) field the newly created questions in parallel with legacy and contemporary items and "criterion" multi-item scales. The latter began with cross-sectional and longitudinal general population surveys in 2010-2011[5] and continued with surveys of the general US and chronically-ill populations in 2020.

MRT: *How does QGEN® compare to legacy and contemporary measures and what are the advantages of QGEN®, what are its limitations?*

JW: Like other single-item-per-domain measures of common domains, it is as short as possible, readily available, and comprehensive with a median 1-minute administration time.

It has advantages: in terms of QOL domain content, it measures the eight most frequently measured QOL outcomes. In terms of efficiency in covering the range of high and low levels, it has been shown to significantly raise the ceiling for six of those domains in comparison with legacy and contemporary single-item-per-domain measures such as same-domain items from the SF-8, SF-36, and PROMIS.

Psychometrically speaking, QGEN® items are as reliable as other single-item scales measuring the same domains. Its items also have high correlations with legacy and contemporary methods of measuring their respective domains (convergent validity), significantly lower correlations with other domains (discriminant validity) and a very similar factor structure for estimating physical and mental summary components.[6] This pattern of increases in response variability, enough to significantly raise the ceiling noted above while maintaining high levels of validity, suggests QGEN® improves efficiency of valid single-item measurement particularly among those who would otherwise be lumped at the ceilings.

QGEN®'s limitations include it being a new method, its coarseness as it only has 5 response categories and lower reliability inherent with all single-item categorical rating scales. However, by correlating highly with and being scored to estimate proven SF-36 profile and physical and mental summary metrics, QGEN® has the advantage of efficiently and without bias estimating those profile and summary scores. This is sufficient to maintain comparability with more than 30 years of population norms, estimates of disease burden and treatment effectiveness and predictive analytics.

MRT: *Can you please address the cross-loading of the QGEN® social function (SF) item on both physical and mental health factors you mention in the slides presented during the webinar?*

JW: Yes, there is a difference in ordering of correlations (factor loadings) with mental (MCS) and physical (PCS) component scores between the SF-36 and QGEN®. In the SF-36 the MCS is higher than the PCS. As for QGEN®, while both component scores are substantial, the PCS is higher than the MCS. This is most likely the result of a change in attribution from "physical and mental health" in the SF-36 and SF-8 to "health" in the QGEN®, a concept which historically has reflected physical more than mental health.

MRT: *Having started with the SF-36 which was a short version considering the number of questions that some of the generic measures had, would you say your results confirm the approach the EuroQol took to developing the EQ-5D?*

JW: When the EQ-5D was developed decades ago, it represented the "state of the art"; which, as we now know, was very few and very skewed items and gaps in QOL content representation that have made the value of improvements more apparent. However, over time such changes were not made to update the tool.

In comparison, (a) all MOS short-form tools with 8 QOL domain representations have been and are more comprehensive than the EQ-5D; (b) the range covered from ceiling to floor for each domain is markedly greater for QGEN®; for example, the two EQ-5D functioning items have 2 times or 3 times more respondents at the ceiling. The new 5-level response category version, which added categories in between the original highest and lowest levels, did not address the ceiling problem.

MRT: *Have DALY and QALY equivalents been estimated for the QGEN® and has the QGEN® been used in cost effectiveness analyses?*

JW: No. Such disability-adjusted and quality-adjusted estimates of a life-year and preference-based scoring of QGEN®-like item improvements would be worth doing and likely to prove useful for some purposes.

In our studies of headache-related disability, for example, we certainly learned that there is more to QOL than "disability-free day or half-day"[7].

MRT: *Are there any data available from clinical trials with a nutritional supplement and QGEN® as primary endpoint?*

JW: Not that I am aware of. However, I would be surprised if QGEN® results disagree in such trials using the SF-36 summary and profile scales[8], because QGEN® estimates SF-36 without bias with about 80% accuracy as a secondary or exploratory endpoint.
As with the hundreds of trials that were the first to try the SF-36 3 decades ago, a good way to find out what works in studies of nutritional supplements, or for other treatments, would be to use QGEN® in parallel with a proven tool. Adding one minute for that purpose is not a substantial intrusion.

MRT: *You mention that current research suggests the addition of 2 more items to the QGEN®-8. Could you explain the rationale behind that and what these items are?*

JW: Two item/domain additions to the original 8, include an item measuring Health Distress (HD) and one of the original HIE/MOS Role General (RG) functioning items.
HD measured by a 6-item MOS scale was first published in 1992[9] and used in the MOS-HIV short form published soon thereafter. HD differs from mental health because it makes specific attributions to "health" as the cause of distress[10]. QGEN® uses the best item from the HD scale, which proved useful in studies of early HIV infection[11].
RG is expected to be useful in QOL studies comparing Eastern and Western countries/cultures because of their apparent differences in making health attributions[12]. RG is expected to reflect physical and mental causes of role limitations more equally in East and West, whereas the role items with a physical or a mental attribution often do not.
Preliminary 2020 results show that both HD and RG substantially improve Physical Composite Score (PCS) and Mental Composite Score (MCS) estimations. Interestingly, in the recent 2020 norming of QGEN® by the US National Opinion Research Center (NORC) during the early months of the COVID crisis, HD was one of the best responders to the impact attributed to this crisis.

MRT: *As a final question for you, John what aspects of QGEN® do you feel need further research?*

JW: I would say: (a) very practical, as opposed to theoretical, tests of how well it serves the dual purposes of monitoring QOL in large sample population surveys limited to single-item-per-domain measures where group means can be precisely compared because of large samples and distinguishing between individuals in the best of health who do not need more in-depth measurement; (b) how often a 1-minute tool leads to the same conclusions as much longer tools measuring the same outcomes; (c) observe real-world rates of adoption to see if it is included in population surveys, disease registries and clinical trials that would not, otherwise, have included QOL measures. We have already seen examples of the latter.

MRT: *After the scientific questions, let us ask Marie-Pierre about the practical side of things. If a pharmaceutical company or a university wish to use the QGEN®, how can they gain access to the measure?*

MPE: As John pointed out in the webinar, MRT is the official distributor of QGEN®, as well as of QDIS®, the disease specific questionnaire John developed and spoke about during a similar webinar earlier this year [13]. MRT is in fact the official distributor of some 600 questionnaires. Organising educational webinars to introduce the measures to the scientific community and providing easy access to same remain a priority for our Managing Director, Sonia Bothorel. To use any instrument you have to submit a request to MRT's ePROVIDE platform https://eprovide.mapi-trust.org/.
When connecting for the first time, you will have to create a profile and a client account, and can then

submit a request to our team. The conditions of use are instrument specific.

***MRT:** So, how does this work for QGEN®? Are the conditions the same for everyone and are there any fees involved?*

MPE: All users of QGEN® are required to sign a Master User License Agreement (MULA) and a Work-Order with MRT. Licensing fees, if any, will be calculated according to the type of license (i.e. study-specific or annual), the mode of administration of QGEN® (i.e. paper or electronic), the number of translations needed and number of administrations of QGEN® in the study, and the category of users (i.e. commercial users, healthcare organizations, funded academic users and not-funded academic users).

***MRT:** What about translations? Which ones are available and who would be responsible for producing new ones?*

MPE: The QGEN®-8, QGEN®-10 and QGEN®-CAT have been developed in English for the USA by JWRG. The three forms have been linguistically validated in Japanese by Dr Shunichi Fukuhara[14] in close collaboration with John Ware. In addition, MRT's linguistic validation partner ICON Language Services recently finalized US Spanish translations of QGEN®-8 and QGEN®-10. For commercial users, new translations shall be produced exclusively by ICON language Services.
A full linguistic validation methodology including forward and backward translations as well as cognitive interviews with patients will be performed, in collaboration with JWRG.
Academic translations in new languages will be authorized by MRT under the following conditions: First, a license agreement and specific work order have to be signed with MRT. MRT will then provide general linguistic validation guidelines to the researcher. The final translation will be distributed by MRT to academic users only, for use in national academic studies exclusively. It should be noted that the John Ware Research Group (JWRG) owns the copyright to QGEN® and all its derivatives.

***MRT:** Thank you John and Marie-Pierre for your time and explanations.*

For anyone who would like to experience the webinar, click on https://xtalks.com/webinars/patient-reported-outcome-assessments-spotlight-on-the-qol-general-qgen-1-minute-alternative-to-sf-36/ and then click on "Register" to view the webinar.

If you have a scientific question, you can contact Dr Ware at john.ware@jwrginc.com
For any questions related to the distribution, translation and electronic migration of the QGEN®, please click on https://eprovide.mapi-trust.org where you will find a description of the three QGEN® forms and will be able to submit your request to the MRT team.

Interview by Katrin Conway, MRT Board Member

(1) Newhouse JP, Archibald RW, Bailit HL, et al.: Free for All? Lessons from the RAND Health Insurance Experiment. Cambridge, MA: Harvard University Press; 1993.
(2) Ware JE, Jr., Bayliss MS, Rogers WH, Kosinski M, Tarlov AR: Differences in 4-year health outcomes for elderly and poor, chronically ill patients treated in HMO and fee-for-service systems. Results from the Medical Outcomes Study. Journal of the American Medical Association 1996;276:1039-47.
(3) Gandek B, Ware JE (Eds.). Translating functional health and well-being: IQOLA Project studies of the SF 36 Health Survey. Journal of Clinical Epidemiology 1998; 51:891-1203.
(4) Ware JE, Jr.: SF-36 Health Survey update. Spine 2000;25:3130-9.
(5) Ware JE, Gandek B, Guyer R and Deng N. Standardizing Disease-specific Quality of Life Measures Across Multiple Chronic Conditions: Development and Initial Evaluation of the QOL Disease Impact Scale (QDIS), Health and Quality of Life Outcomes 2016; 14:84.
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(7) Ware JE, Jr., Bjorner JB, Kosinski M: Practical implications of item response theory and computerized adaptive testing: A brief summary of ongoing studies of widely used headache impact scales. Medical Care 2000;38:II73-82.
(8) K Kalantar-Zadeh K, Kopple JD, Block G, Humphreys MH. J Am Soc Nephrol 2001 Dec;12(12):2797-806. Association among SF36 quality of life measures and nutrition, hospitalization, and mortality in haemodialysis.
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(10) Stewart AL, Ware JE, Jr., Sherbourne CD: Psychological distress/well-being and cognitive functioning measures, in Stewart AL, Ware JE, Jr. (eds): Measuring Functioning and Well-Being: The Medical Outcomes Study Approach, Raleigh-Durham, NC: Duke University Press; 1992:102-142.
(11) Wu AW, Rubin HR, Mathews WC, et al.: A health status questionnaire using 30 items from the Medical Outcomes Study. Preliminary validation in persons with early HIV infection. Medical Care 1991;29:786-98.
(12) Suzukamo Y, Fukuhara S, Green J, Kosinski M, Gandek B, Ware JE. Validation testing of a three-component model of Short Form-36 scores. J Clin Epidemiol 2011; 64:301-8.
(13) link to QDIS webinar: https://xtalks.com/webinars/patient-reported-outcomes-assessments-the-quality-of-life-disease-impact-scale/
(14) Dr. Shunichi Fukuhara is a Professor and a former Dean of School of Public Health in the Kyoto University Graduate School of Medicine (2013-16).