DOSE FOR ULTRASOUND THERAPY - WHAT DOES IT MEAN TO YOU?

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Ultrasound for Therapy (USTherapy) is a large international project which aims to develop the metrological infrastructure for the determination of ultrasound exposure and dose to tissue. In order to seek the views of the wider ultrasound community and to review dose and in situ exposure questions that have been suggested or used previously, we have created a web-based questionnaire (www.surveymonkey.com/s/duty-dose) with a range of questions covering the type of ultrasound equipment that is used and the range of applications for which it has been developed.

This questionnaire covers all therapeutic ultrasound applications (including physiotherapy, lithotripsy, drug delivery, etc.) and asks specific questions about quantifying in situ exposure and dose, especially with a view to eventual treatment planning, standardisation and/or regulation.

The answers to this questionnaire will be made available online and will be important in formulating future International Standards. This paper discusses some of the issues around defining quantities for ultrasound dose and in situ exposure, and summarises answers submitted up to the end of March 2014.

The questionnaire will remain open until at least the end of June 2014 and we encourage further submissions to build up the fullest possible picture of the development and use of therapeutic ultrasound.

The project

This work forms part of a project titled Ultrasound for Therapy (USTherapy) which is supported in part by the European Metrology Research Programme. Jointly with eight other institutes (Table 1) the project (Work Package 1: Quantities for the determination of ultrasound exposure and dose to tissue) is carried out by the National Physical Laboratory (UK) in partnership with eight other institutes. www.ustherapy.org

The survey

The set of questions at www.surveymonkey.com/duty-dose will help us build up a picture of the current use going into therapeutic ultrasound applications and measurements relating to all therapeutic ultrasound applications (including physiotherapy, lithotripsy, drug delivery, etc.). It contains specific questions about your opinions on quantifying in situ exposure and dose, especially with a view to eventual treatment planning, standardisation and/or regulation.

The survey is divided into four main sections:

1. Your personal details — which asks about the applications of therapeutic ultrasound with which you have a significant involvement and about the type of ultrasound exposure measurement that you work with.
   - Measurements you currently perform
   - What parameters you measure
   - Measurements you currently perform in combination with other techniques

2. Measurements you currently make — which asks about the definition and measurement of dose.
   - How do you quantify the exposure?
   - How do you quantify the dose?
   - Dose quantities that you quote
   - Dose quantities that you regard as the most important

3. Applications — which asks about the transducers and acoustic fields that you work with.
   - Your therapeutic ultrasound application
   - Your therapeutic ultrasound application
   - What characteristics of the ultrasound exposure do you think are important?

4. How do you think the results? — which asks about your experience of using ultrasound for therapy.
   - What mechanisms do you think are important?
   - What are the most likely to benefit from a better definition of ultrasound dose?

The answers

Response to selected questions are given below. The full survey contains a much wider set of questions covering the type of equipment that is used and the range of applications for which it has been developed and respondents will be able to access the full set of anonymous answers. Please take the time to visit the website and give your answers now.

In which uses is your current role in Therapeutic Ultrasound? Please select the role(s) that most clearly describe your area of work.

- Clinical use
- Medical research
- Industrial development
- Measurement and/or quality assurance
- Standards and/or regulation
- Training and/or treatment planning

How long have you been working in Therapeutic Ultrasound? (including any post-graduate training such as Masters or PhD)

- Less than 5 years
- 6 to 10 years
- 11 to 15 years
- 16 to 20 years
- More than 20 years

In which country do you primarily work or study at present?

- United States of America
- United Kingdom
- France
- Germany
- Italy
- Switzerland
- Netherlands
- Belgium
- Turkey
- Other (please specify)

The exposure level depends on the source and the acoustic properties of the ultrasound. Part of the project (Work Package 1: Quantities for the determination of ultrasound exposure and dose to tissue) is carried out by the National Physical Laboratory (UK) in partnership with eight other institutes. www.ustherapy.org

In medicine, the term is usually applied to the quantity of a drug or other agent — the larger the dose, the larger the effect.

Dose quantities that apply.

- Physical quantities
- Nuclear quantities
- Thermodynamic quantities
- Chemical quantities

Dose quantities for ultrasound

- ‘Dose’ to therapeutic ultrasound.

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