



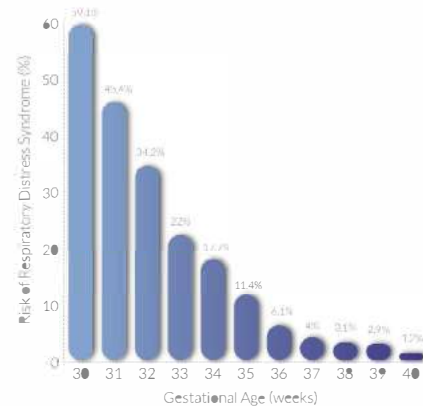
A Revolution in Ultrasound-Based Diagnosis

The First 100% Non-Invasive test to predict
Neonatal Respiratory Morbidity Risk



AN UNSOLVED CLINICAL NEED

- Preterm Birth Rate is increasing year by year in developed countries.
- Neonatal Respiratory Morbidity* remains as the leading problem in preterm babies despite prenatal and postnatal treatments.
- Current tests for the assesment of Fetal Lung Maturity** (FLM) require an amniocentesis, wich limits their practice due to the associated risks and discomfort.



Data extracted and adap ted from differents publications: J AMA 2010, JAMA Pediatr, 2013 and Paediatr Perinat Ep. 2013

quantusFLUNG – theFirst 100% non-invasive Fetal Lung Maturity test

- Non-invasive: quantusFLUNG is the first Fetal Lung Maturity test in the market based on analysis of an ultrasound image of the fetal lungs. It gives the opportunity to avoid the need for an invasive technique to predict Neonatal Respiratory Morbidity in the clinical practice.
- Fast: quantusFLUNG can provide accurate results in just a few minutes.
- Reliable: The quantitative analysis of the fetal lung ultrasound texture has previously shown to be comparable with those tests based on the analysis of the amniotic fluid.

	Sensitivity	Specificity	PPV	NPV
L/S Ratio ^A	74,6%	82,5%	34,1%	94,4%
PG ^A	82,7%	54,4%	18,0%	96,3%
Lamellar body ^A	84,2%	74,4%	27,9%	97,6%
quantusFLM ^B	71,0%	94,7%	67,9%	95,4%

L/S:Leothin / Sphingomyelin
PG:Phosphatidol Glycerol

^A Average reported values (references 4-9) in clinical studies
^B Data extracted and adapted from Scientific Reports volume 9, Art. Num: 1950 (2019)

quantusFLUNG's Specifications: 32<= Gestational Age <= 38

Accuracy	Sensibility	Specificity	PPV	NPV
92,4%	52,8%	95,5%	49,1%	96,1%

PPV as Positive Predictive Value NPV as Nehative Predictive Value

*Defined as either Respiratory Distress Syndrome or Transient Tachypnea of the newborn that requires his admission to a special unit and the use of medical respiratory support.

**The term "Fetal Lung Maturity" is universally used by the scientific and medical community to define the capacity of fetal lungs to achieve normal respiratory function if the fetus is born.

HOW TO USE quantusFLUNG?

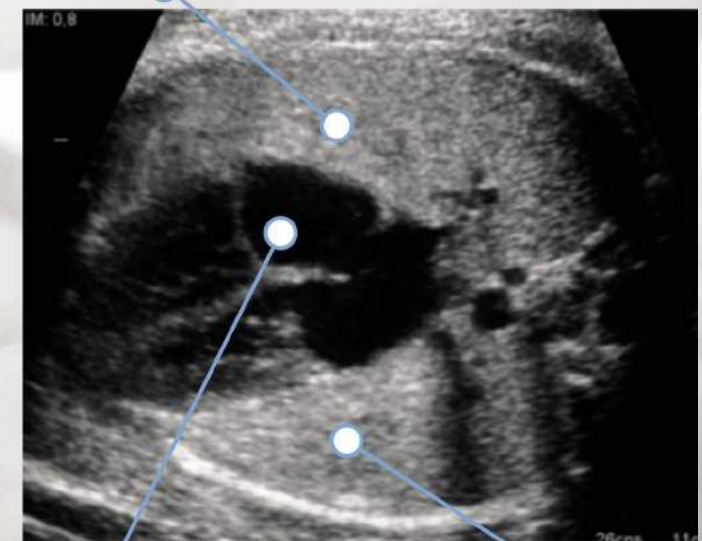
Using quantusFLUNG is easy only with 3 simple steps:



Step 1: Acquire an ultrasound image

Obtain ultrasound images of the fetal thorax at the level of the cardiac 4-chamber view in DICOM format. A clear guideline on how to acquire optimal images is available inside quantusFLM web application.

PROXIMAL LUNG



HEART

DISTAL LUNG

Step 2: Use quantusFLUNGweb application to analyze the image

quantusFLUNG web application is a simple tool that allows you to send to the system the image you want to analyze. You just need to follow 4 simple steps to complete the analysis:



Upload

The DICOM image.
More than one image
can be upload for your
convenience.



Label

Introduce clinical data
to be analysed.



Select

The desired image
to be analysed.



Send

The sample to be
analysed.

Step 3: Get the results from the web application in just a few minutes.

Fetal Lung Maturity Test

YOUR LOGO HERE

Patient & Provider Information

PATIENT NAME	CLINIC NAME
Patient ID	REFERRING/ORDER CLINICIAN
quantusFLUNG ID	Doctor Name
XXXX-227	REPORT DATE
	04/04/2020 16/04/2020

Sample Information

Test Result from NIRM

quantusFLUNG ID:

XXXX-227

Baseline risk by gestational age:

4 %

Risk adjusted by quantusFLUNG®:

28.1 %

NEONATAL RESPIRATORY MORBIDITY RISK

Authorized signers

Technical responsible:
Alvaro Pérez Moreno

1) The risk indicates the probability of Neonatal Respiratory Morbidity (NRM), which is defined as respiratory distress syndrome or transient tachypnea of the newborn, determined by means of adjusting the baseline risk for gestational age by the positive or negative sign test obtained by the analysis of ultrasound fetal lung biometry.

2) The risk indicates the probability of Neonatal Respiratory Morbidity (NRM), which is defined as respiratory distress syndrome or transient tachypnea of the newborn, determined by means of adjusting the baseline risk for gestational age by the positive or negative sign test obtained by the analysis of ultrasound fetal lung biometry.

3) The risk indicates the probability of Neonatal Respiratory Morbidity (NRM), which is defined as respiratory distress syndrome or transient tachypnea of the newborn, determined by means of adjusting the baseline risk for gestational age by the positive or negative sign test obtained by the analysis of ultrasound fetal lung biometry.

WHEN TO USE quantusFLUNG

quantus FLUNG can be particularly useful where elective delivery could be an acceptable option but the risk of Neonatal Respiratory Morbidity should be known.

In many clinical situations the decision of whether to deliver or wait is in a "grey zone", particularly in late preterm to early-term (32+0 to 38+6 weeks) pregnancies. Typical examples can be:

- Difficult-to-control hypertension or diabetes,
- maternal fluid retention with edema,
- very symptomatic cholestasis,
- previous history of unexplained fetal death or abruption,
- and any situation where an elective cesarean section <39+0 weeks is considered.

In these and other circumstances delivery may be a reasonable, but not an absolute, option to avoid danger to mother or fetus. Knowing the risk of Neonatal Respiratory Morbidity can be a critical information in the decision-making process, either to confirm or otherwise delay delivery.

For instance, in a 36+0 week pregnancy, the baseline risk of morbidity and NICU admission for respiratory support is 6.1%. However, a risk adjusted by quantusFLUNG the baseline risk might reduce the chances of morbidity to 5.2%, while if the risk adjusted by quantusFLUNG is above the baseline risk, the probability of respiratory morbidity might be 33.7%. Thus, knowing FLUNG (without the need of an invasive technique) may have a clear impact in the clinical management of this case.



quantusFLUNG OFFERS TIMELESS AND BORDERLESS USER EXPERIENCE:

- ✓ **Unrestricted and 24/7 access:** As long as there is Internet, you can use quantusFLUNG and review the results ANYTIME, ANYWHERE.
- ✓ **No installation required:** quantusFLUNG is designed to give new users an easy start because neither downloading nor installation of any software is required.
- ✓ **Great compatibility:** quantusFLUNG is compatible with the main web browsers as well as the most commonly-used Obstetrics and Gynecology Ultrasound Machines.

quantusFLUNG OFFERS GREAT ECONOMIC VALUE:

- ✓ **NO initial infrastructure investment is required!**
- ✓ **Pay per Use: You pay for each analysis you order!**
- ✓ **30-day FREE trial available, no conditions!**

Get your
30-day
FREE Trial

To sign up for a 30-day FREE trial,
contact us at
sales@transmuralbiotech.com

WHY DOES quantusFLUNG WORK?

Changes occurring at the histological level of a tissue, including the proportion of collagen, fat or water, among others, affect ultrasound backscattering signals. This constitutes the basis for ultrasound image reconstruction. Computerized quantitative ultrasound analysis detects extremely subtle changes, unperceivable by the human eye, in order to accurately infer relevant information of tissue microstructure.

Fetal Lung Maturity constitutes an obvious candidate for the use of quantitative ultrasound solutions as it results from the combination of the evolving changes in lung airways and alveoli during gestation, and the concentration of surfactant. Over the last 30 years research has focused on the extraction of quantitative information about tissue characteristics from ultrasound images.

Transmural Biotech's quantusFLUNG software uses a combination of cutting-edge image analysis technologies that make individualized predictiveness of the risk of Neonatal Respiratory Morbidity. quantusFLUNG reaches unprecedented levels of accuracy and reproducibility for a completely non-invasive ultrasound-based test.

References

1. Adverse neonatal outcomes associated with early-term birth. S. Sengupta, V. Carrion, J. Shelton, R.J. Wynn, R.M. Ryan, K. Singhal and S. Lakshminrusimha. *AMA Pediatr.* 2013 Nov 1;167(11):1053-9.
2. Respiratory morbidity in late preterm births. Consortium on Safe Labor. *JAMA.* 2010 Jul 28;304(4):419-25.
3. Risk factors for acute respiratory morbidity in moderately preterm infants. M. Altman, M. Vanpée, S. Nattani and M. Norman. *Paediatr Perinat Epidemiol.* 2013 Mar;27(2):172-81.
4. A comparison of the accuracy of the TDx-FLM assay, Lecithin-Sphingomyelin Ratio, and Phosphatidylglycerol in the prediction of Neonatal Respiratory Distress Syndrome. E. Hagen, J.C. Link and F. Arias. *Obstet Gynecol* (1993) 82, 1004-8.
5. A Direct Comparison Between Lamellar Body Counts and Fluorescent Polarization Methods for Predicting Respiratory Distress Syndrome. S. Haymond, V. Luzzi, C.A. Parvin and A.M. Gronowski. *Am J Clin Pathol* (2006) 126, 894-899.
6. Gestational age-specific predicted risk of neonatal respiratory distress syndrome using lamellar body count and surfactant-to-albumin ratio in amniotic fluid. R. Karcher, E. Sykes, D. Batton, Z. Uddin, G. Ross, E. Hockman and G.H. Shade Jr. *AJOG* (2005) 193, 1680-4.
7. Lamellar Body Counts Compared With Traditional Phospholipid Analysis as an Assay for Evaluating Fetal Lung Maturity. M.G. Neehof, E. Haney, R.K. Silver, E.R. Ashwood, I.S. Lee and J.J. Plazze. *Obstet Gynecol* (2001) 97, 305-9.
8. Multicenter Evaluation of TDx Test for Assessing Fetal Lung Maturity. J.C. Russell, C.M. Cooper, C.H. Ketchum, J.S. Torday, D.K. Richardson, J.A. Holt, L.A. Kaplan, J.R. Swanson and W.M. Ivie. *Clin Chem* (1989) 35/6, 1005-1010.
9. Neonatal morbidity after documented fetal lung maturity in late preterm and early term infants. B.D. Kamath, M.P. Marcotte and E.A. DeFranco. *AJOG* (2011) 204, 518.e1-8.
10. Quantitative Ultrasound Texture Analysis of Fetal Lungs to Predict Neonatal Respiratory Morbidity. Bonet-Carne E, Palacio M, Cobo T, Perez-Moreno A, Lopez M, Piraquive JP, Ramirez JC, Marques F, Gratacos E. *Ultrasound Obstet Gynecol.* 2014 Jun 11. doi: 10.1002/uo.13441
11. Changing patterns of fetal lung maturity testing. K.T. McGinnis, J.A. Brown and J.C. Morrison. *Journal of Perinatology.* 2008 Jan; 28(1):20-3.
12. Clinical and laboratory trends in fetal lung maturity testing. D. G. Grenache, A.R. Wilson, G.A. Gross and A.M. Gronowski. *Clin Chim Acta.* 2010 Nov 11;411 (21-22):1746-9.
13. Effectiveness of antenatal corticosteroids in reducing respiratory disorders in late preterm infants: randomised clinical trial. A.M. Porto, I.C. Coutinho, J.B. Correia and M.M. Amorim. *BMJ.* 2011 Apr 12; 342:d1696
14. Monitoring structural changes in cells with high-frequency ultrasound signals. A.S. Tunis, G.J. Czarnota, A. Gile, S.M.D. Sherar, J.W. Hunt, and M.C. Kolios. *Ultrasound in Med and Biol.* 2005 Aug; 31(8):1041-9.
15. Performance of an automatic quantitative ultrasound analysis of the fetal lung to predict fetal lung maturity. M. Palacio, T. Cobo, M. Martínez-Torrón, G. Rattá, E. Bonet-Carne, I. Amat-Roldán and E. Gratacos. *Am J Obstet Gynecol.* 2012 Dec; 207(6):504.e1-5.
16. Practice Bulletin Clinical Management Guidelines for Obstetricians. American College of Obstetricians and Gynecologists (ACOG). September 2008, Number 97.
17. Revisiting Amniocentesis for Fetal Lung Maturity After 36 Weeks' Gestation. G. Luo, and E.R. Norwitz. *Rev Obstet Gynecol.* 2008 Spring; 1(2): 61-68.
18. Quantitative ultrasonography. M.F. Insana, B.S. Garra, S.J. Rosenthal and T.J. Hall. *Med Prog Technol.* 1989; 15(3-4):141-53.
19. Theoretical framework for spectrum analysis in ultrasonic tissue characterization. F.L. Lizzi, M.G. Reinbaum, E.J. Feleppa, M. Elbaum and D.J. Coleman. *J Acoust Soc Am.* 1983; 73(4):1366-1373.
20. The ultrasonic changes in the maturing placenta and their relation to fetal pulmonary maturity. P.A. Grannum, R.L. Berkowitz, and J.C. Hobbin. *Am J Obstet Gynecol.* 1979 Apr 15;133(8):915-22.
21. An investigation of backscatter power spectra from cells, cell pellets and microspheres. M.C. Kolios, L. Taggart, R.E. Baddour, F.S. Foster, J.W. Hunt, G.J. Czarnota and M.D. Sherar. 2003 IEEE Symposium on Ultrasonics; 1:752-57.
22. Prediction of neonatal respiratory morbidity by quantitative ultrasound lung texture analysis: a multi-center study. Palacio M, Bonet-Carne E, Cobo T, Pérez-Moreno A, Sabrida Rius J, Richter J, Kacerovsky M, Jacobsson B, García-Posada RA, Bugatto F, Santistevan R. *American Journal of Obstetrics and Gynecology.* 2017, vol. 217, num. 2, p. 196. 2017.



www.quantusFLUNG.com



NON INVASIVE



RELIABLE



FAST



**We offer a 30-DAY FREE Trial
without any conditions.**

Contact us now to try it for free!



quantusFLUNG is a medical device in accordance to EU regulation



Transmural Biotech S.L., CIF: B65084675.

C/ Beethoven 15 Planta 4 Desp. 18 08021 Barcelona, Spain

Revision 3 21/04/2020