QUIDS Study

Quantitative Fetal Fibronectin (qfFN) to Help Improve Decision Making in Women with Symptoms of Preterm Birth [1,2]

A meta-analysis and prospective cohort study to develop a prognostic model, with qfFN and clinical risk factors, for predicting spontaneous preterm birth within 7 days of qfFN testing [1,2]

The leading cause ofb neonatal morbidity and mortality is **preterm birth** (~15 million preterm births worldwide each year) [3,4]

Diagnosing preterm labour is challenging as signs and symptoms are **nonspecific** [1]

Timely interventions in women presenting with preterm labour can substantially improve health outcomes for preterm babies; these include: [5–8]

Birth in a centre with appropriate **neonatal care facilities**

Antenatal corticosteroids for **lung maturity** administered within 7 days of birth

Peripartum magnesium sulphate administered for **neuroprotection**

Intrapartum antibiotics to **prevent** early onset neonatal **Group B Streptococcal infection**

QUIDS [1,2,9]

Aim

To develop a risk prediction model for spontaneous preterm birth within 7 days of testing in women with symptoms of preterm labour, using vaginal fluid qfFN in combination with the following clinical risk factors:

- **Smoking status**
- **Multiple pregnancy**
- **Ethnicity**
- **Nulliparity**

Individual patient data meta-analysis
5 studies of qfFN
1,783 women
139 events of sPTB within 7 days

Health economic analysis
Decision analytical model

PART 1 — Initial prognostic model

Prospective cohort study
26 UK maternity units (2016–18)
2,924 women with qfFN test result
85 events of sPTB within 7 days

Validate +/- refine model

Interviews in subset of cohort

Update economic model

Full prognostic model

Acceptability

Cost effectiveness

PART 2 — Decision support tool

QUIDS 2 [2]

Aim

To provide a preliminary comparison of the independent prognostic value of Actim® Partus, PartoSure® and qfFN in women with signs and symptoms of preterm labour

Exploratory prospective cohort study
19 UK maternity units (2018–19)
501 women
8 events of sPTB within 7 days
Clinicians blinded to risk prediction model
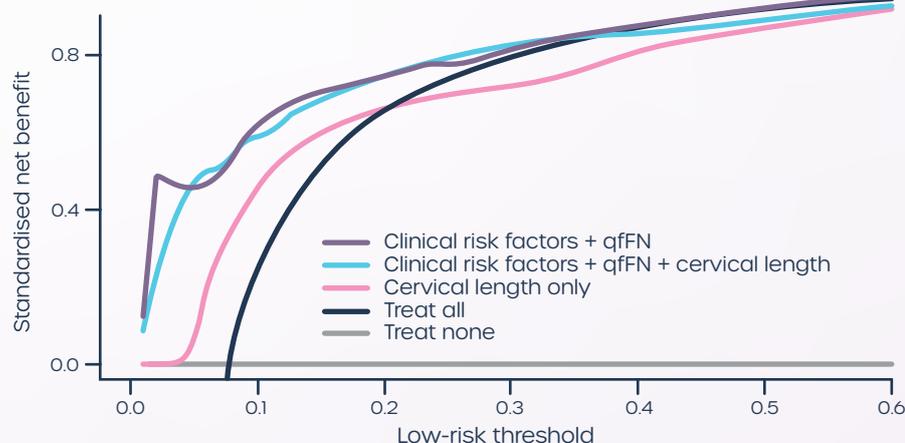
Prognostic performance

Cost effectiveness

The only UK study in which all three preterm birth tests are directly compared in samples from the same women

QUIDS Results [1,2]

In order to evaluate the potential clinical value of the QUIDS risk prediction model to inform decision making, net benefit analyses were performed, where benefits and harms of the model were put on the same scale to allow direct comparison

Net benefit of the QUIDS risk prediction model versus other models [2]

Standardised net benefit vs Low-risk threshold

- Clinical risk factors + qfFN
- Clinical risk factors + qfFN + cervical length
- Cervical length only
- Treat all
- Treat none

Greater net benefit when qfFN included [1]

Similar net benefit with or without cervical length [1]

Using a low-risk threshold of 2%, the QUIDS model had: [1]
+ a sensitivity of 0.85 (95% CI: 0.76, 0.93)
+ a false-positive rate of 0.28 (95% CI: 0.27, 0.30)

QUIDS 2 Results [2]

The exploratory analysis in QUIDS 2 provided **no evidence** that an alternative model based on a different test of preterm birth would be superior to a model using qfFN

Diagnostic test accuracy [2]

	Sensitivity (95% CI)	Specificity (95% CI)	Positive LR (95% CI)	Negative LR (95% CI)
Qualitative fFN	71.43 (29.04, 96.33)	83.0 (79.39, 86.20)	4.20 (2.53, 6.98)	0.34 (0.11, 1.11)
Actim® Partus	57.14 (18.41, 90.10)	64.57 (60.18, 68.80)	1.61 (0.84, 3.10)	0.66 (0.28, 1.57)
PartoSure®	14.29 (0.36, 57.87)	95.34 (93.10, 97.03)	3.07 (0.48, 19.67)	0.90 (0.66, 1.22)

PartoSure® had the highest specificity, but this was at the expense of a low sensitivity

with only 1 in 7 preterm births being preceded by a positive PartoSure® test [2]

Even if the sensitivity of PartoSure® was at the upper end of the CI, the false-negative rate would be unacceptable (~57%) [2]

In conclusion, the QUIDS risk prediction model... [1,2]

- showed **excellent performance** in the prediction of spontaneous preterm birth within 7 days of qfFN testing

- has the potential for immediate benefit to women, babies and health services through **avoidance of unnecessary admission** and treatment

- can be used to help **guide management decisions** for women with threatened preterm labour

- is **cost effective** and **readily implementable**

[1] Stock SJ, Horne M, Bruijn M, et al. Development and validation of a risk prediction model of preterm birth for women with preterm labour symptoms (the QUIDS study): a prospective cohort study and individual participant data meta-analysis. PLOS Med 2021;18:e1003686; [2] Stock SJ, Horne M, Bruijn M, et al. A prognostic model, including quantitative fetal fibronectin, to predict preterm labour: the QUIDS meta-analysis and prospective cohort study. Health Technol Assess 2021;25:1–168; [3] UN IGME. Levels & trends in child mortality: report 2019. Estimates developed by the UN Inter-agency Group for Child Mortality Estimation. United Nations Children's Fund: New York, NY, USA; 2019; [4] Chawanpaiboon S, Vogel JP, Moller A-B, et al. Global, regional, and national estimates of levels of preterm birth in 2014: a systematic review and modelling analysis. Lancet Glob Health 2019;7:e37–46; [5] Marlow N, Bennett C, Draper ES, et al. Perinatal outcomes for extremely preterm babies in relation to place of birth in England: the EPICure 2 study. Arch Dis Child Fetal Neonatal Ed 2014;99:F181–8; [6] McGoldrick E, Stewart F, Parker R, et al. Antenatal corticosteroids for accelerating fetal lung maturation for women at risk of preterm birth (review). Cochrane Database Syst Rev 2020;12:CD004454; [7] Doyle LW, Crowther CA, Middleton P, et al. Magnesium sulphate for women at risk of preterm birth for neuroprotection of the fetus (review). Cochrane Database Syst Rev 2009;1:CD004661; [8] BAPM. Antenatal optimisation for preterm infants less than 34 weeks. A quality improvement toolkit. London, United Kingdom; 2020; [9] Stock SJ, Wotherspoon LM, Boyd KA, et al. Quantitative fibronectin to help decision-making in women with symptoms of preterm labour (QUIDS) part 1: Individual participant data meta-analysis and health economic analysis. BMJ Open 2018;8:e020796

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