GDM

November 2018

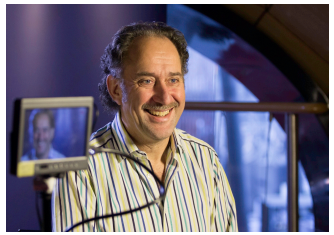
Progress Update

EPSRC
Engineering and Physical Sciences Research Council

Queen Mary University of London

Barts and The London School of Medicine and Dentistry

Clinical team



Graham A Hitman
Professor of Molecular Medicine and Diabetes

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Research Fellow in Midwifery

Sarah Finer
Clinical Senior Lecturer and Honorary Consultant Diabetologist

Bobby Huda
Consultant Diabetologist and Honorary Senior Lecturer

Gestational diabetes (GDM)

- Glucose intolerance arising in pregnancy
- A common medical disorder in pregnancy, affecting 8-24% of women
- Risk factors: south Asian ethnicity, overweight/obesity, maternal age, physical inactivity, polygenic risk

- Diagnosed at 16-28 weeks of pregnancy
- **Self-monitored** with x4/daily blood glucose monitoring
- Controlled with intensive diet and lifestyle support, +/- metformin, +/- insulin
- **Frequent review and complex decision-making** by multi-disciplinary antenatal diabetes team

- Associated with **adverse maternal and fetal outcomes and poor quality of life**
- 50-70% of women with GDM will develop type 2 diabetes within 5-10 years of GDM

- GDM is expensive to diagnose and treat (especially **high staff costs**)
- Health economic modelling suggests that costs fall well above the >£20,000 threshold of quality-adjusted life years

Gestational diabetes in east London

- Barts Health NHS Trust – The largest provider of maternity services (16,000 births per year)
- At least 1,500 women with GDM managed every year
- Wide ethnic diversity (European, South Asian, South-East Asian, African)
- Significant pressure on resources to deliver high quality GDM care
- Patient experience of GDM care variable and could be improved
- High quality routine care data and linkage to primary care
- GDM service improvement and innovation (lead, Dr Pippa Hanson)
- Thriving clinical academic environment in diabetes and women's health

Aims of the GDM case study

Create a new generation of easy-to-use, computerised clinical support systems to:

- support monitoring of women with gestational diabetes
- aid decision making of health professionals
- reduce pressure on busy clinical settings
- improve outcomes and experience of pregnancy care

Experimental approach

1. **Quantitative data collection from routine care**: inform ‘decision nodes’ and develop Bayesian networks

2. **Qualitative data collection**: identify acceptability and contextual factors to guide development of a clinical decision support tool

3. **Clinical guideline and care pathway mapping**: to guide implementation of a future clinical decision support tool

Quantitative data collection from routine care: Decision nodes

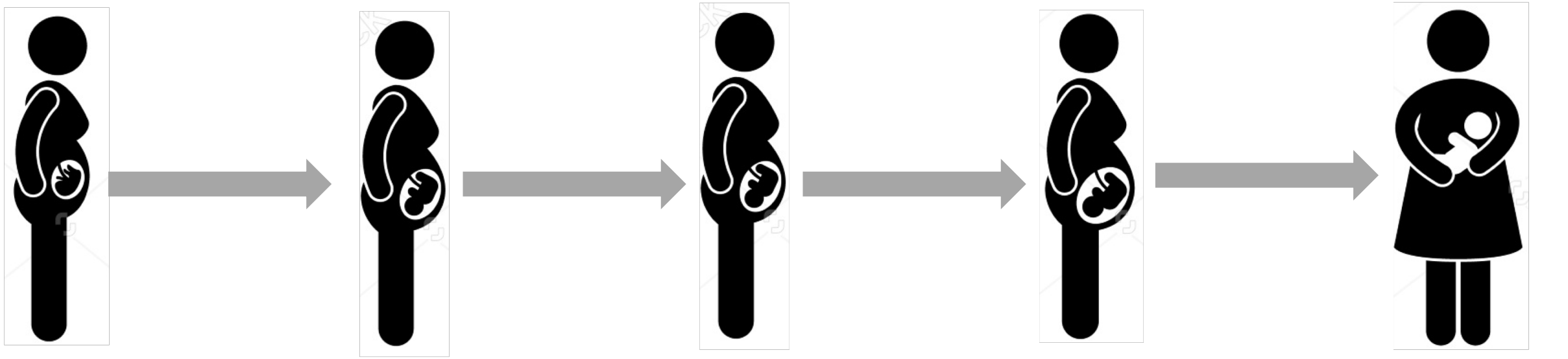
Decision node 1: GDM screening and diagnosis

Decision node 2: Care pathway - community vs. hospital

Decision node 3: Initiation & titration of treatment

Decision node 4: Delivery decision – timing and mode

Decision node 5: Prediction & management of T2D risk



Booking visit
~12 weeks

GDM diagnosis
16-28 weeks

GDM management
16-40 weeks

Delivery
37-40 weeks

Postnatal testing
12+ weeks postnatal

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Quantitative data collection from routine care: data sources

	Decision node 1: GDM screening and diagnosis	Decision node 2: Care pathway - community vs. hospital	Decision node 3: Initiation & titration of treatment	Decision node 4: Delivery decision – timing and mode	Decision node 5: Prediction & management of T2D risk
Dataset 1: • Retrospective routine data from Newham Hospital • Sample size ~8000 • Unselected	✓	✓	✗	✓	✓
Dataset 2 • Retrospective routine data from Royal London Hospital • Sample size ~1000 • Selected	✗	✓	✗	✓	✗
Dataset 3 • Prospective data collected from Newham and/or Royal London • Sample size ~500 • Unselected	✓	✓	✓	✓	✓

Quantitative data collection from routine care: current progress

- Dataset 1: pseudonymised, and undergoing cleaning and processing
- Dataset 2: cleaned and processed, awaiting pseudonmyisation
- Dataset 3: data collection will start February 2019
- It is hoped that Dataset 3 will be supplemented by data from Sensyne GDm app

Quantitative data collection from routine care: data issues

1. Audit vs. research
2. Data safety: pseudonymisation
3. Obtaining high quality retrospective clinical data from electronic health records is challenging
4. Some decision nodes can only be informed by manually-obtained prospective data collection
5. Lack of technological support of routine care currently (e.g. blood glucose data downloads)
6. Sensitivity of collecting routine patient data in clinical setting

Qualitative data collection

Aims: identify usefulness, acceptability and contextual factors to guide development of a clinical decision support tool

- Semi-qualitative work, undertaken via structured questionnaires and semi-structured interviews
- Target groups: women with GDM, multidisciplinary clinicians, policymakers/commissioners

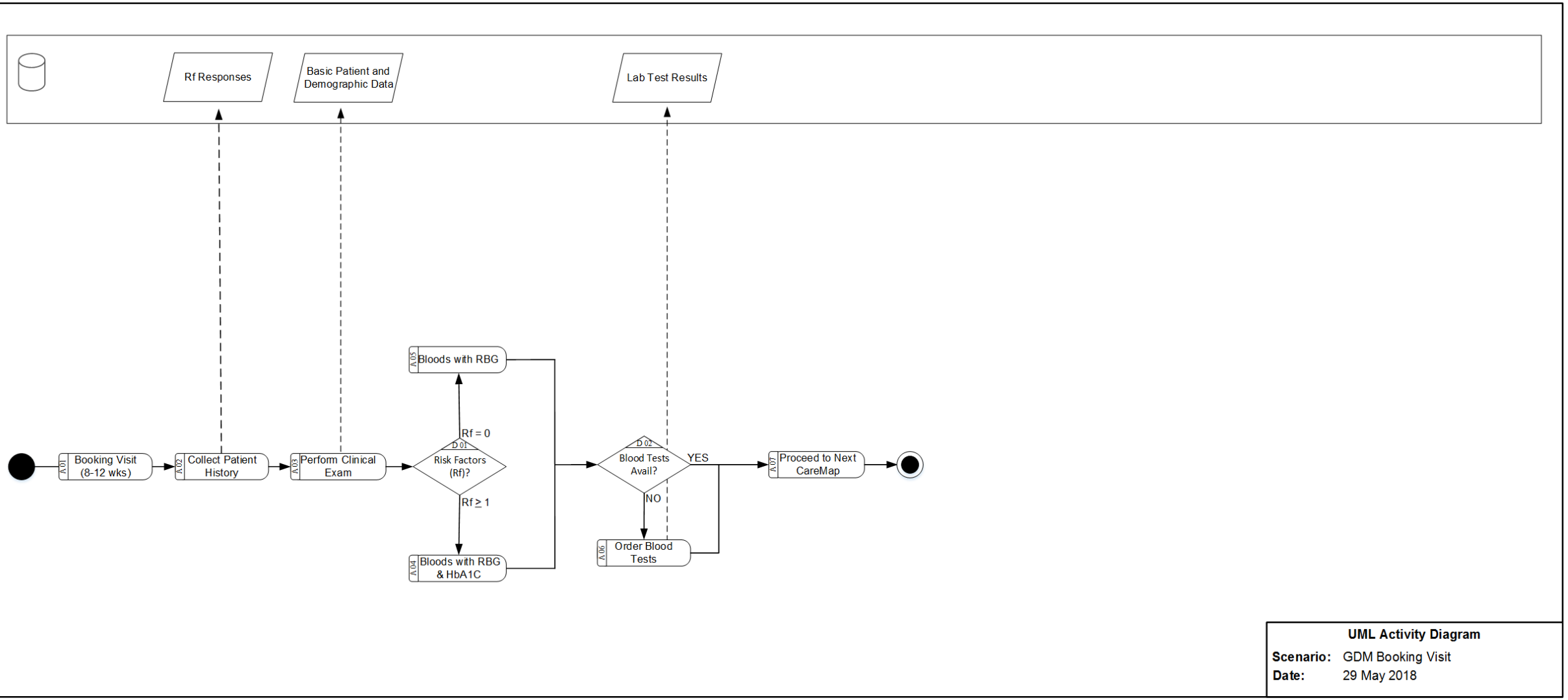
- Uses existing validated questionnaires:
  - Oxford Maternity Diabetes Treatment Satisfaction Questionnaire: developed to test patient satisfaction with a remote blood glucose self-monitoring system for women with GDM.
  - Diabetes Treatment Satisfaction Questionnaire: assessment of overall treatment satisfaction in a wide variety of settings
  - Diabetes Self-Management Questionnaire: covers locus of control and empowerment in self-care.

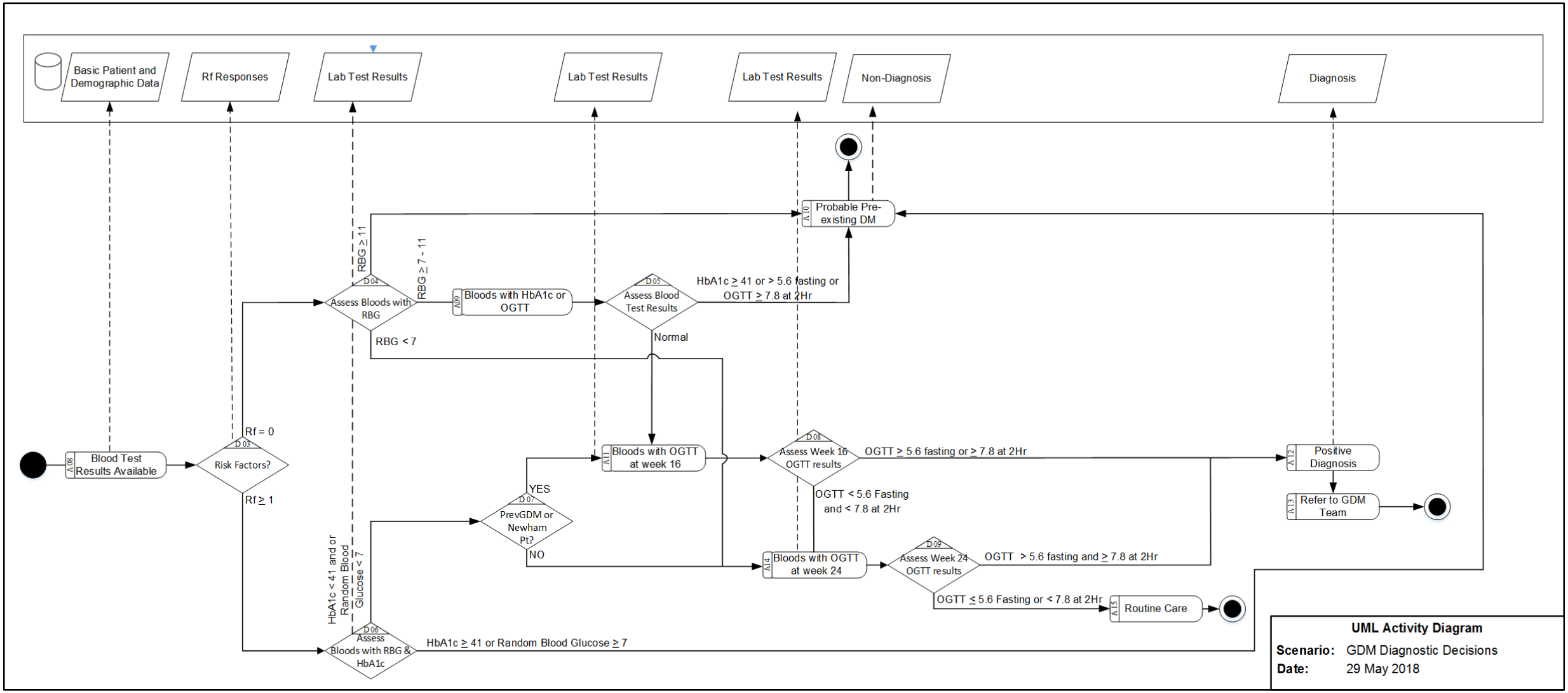
- Requires ethics/HRA approval

Clinical guideline and care pathway mapping

Aims: to guide implementation of a future clinical decision support tool.

- Agree II study
  - To evaluate rigour of the clinical care guidelines being used to inform the decision tool
  - Paper pending review for publication in BMJ Open
    - Barts Health Trust “DIABETES – PREGNANCY, LABOUR AND PUERPERIUM” scored well
- Clinical Care Pathway Mapping
  - Develop systematic approach to mapping clinical care pathways into Care Maps (McLachlan et al, 2019)
  - Identify care pathways at key decision nodes and develop Care Maps to inform decision tool
  - Care Maps produced for GDM Booking Visit, GDM Diagnosis Decisions and GDM Management Decisions


Rf Responses
Basic Patient and Demographic Data
Lab Test Results
A 01 Booking Visit (8-12 wks)
A 02 Collect Patient History
A 03 Perform Clinical Exam
D 01 Risk Factors (Rf)?
Rf = 0
Rf ≥ 1
A 05 Bloods with RBG
A 04 Bloods with RBG & HbA1C
D 02 Blood Tests Avail?
YES
NO
A 06 Order Blood Tests
A 07 Proceed to Next CareMap
UML Activity Diagram
Scenario: GDM Booking Visit
Date: 29 May 2018



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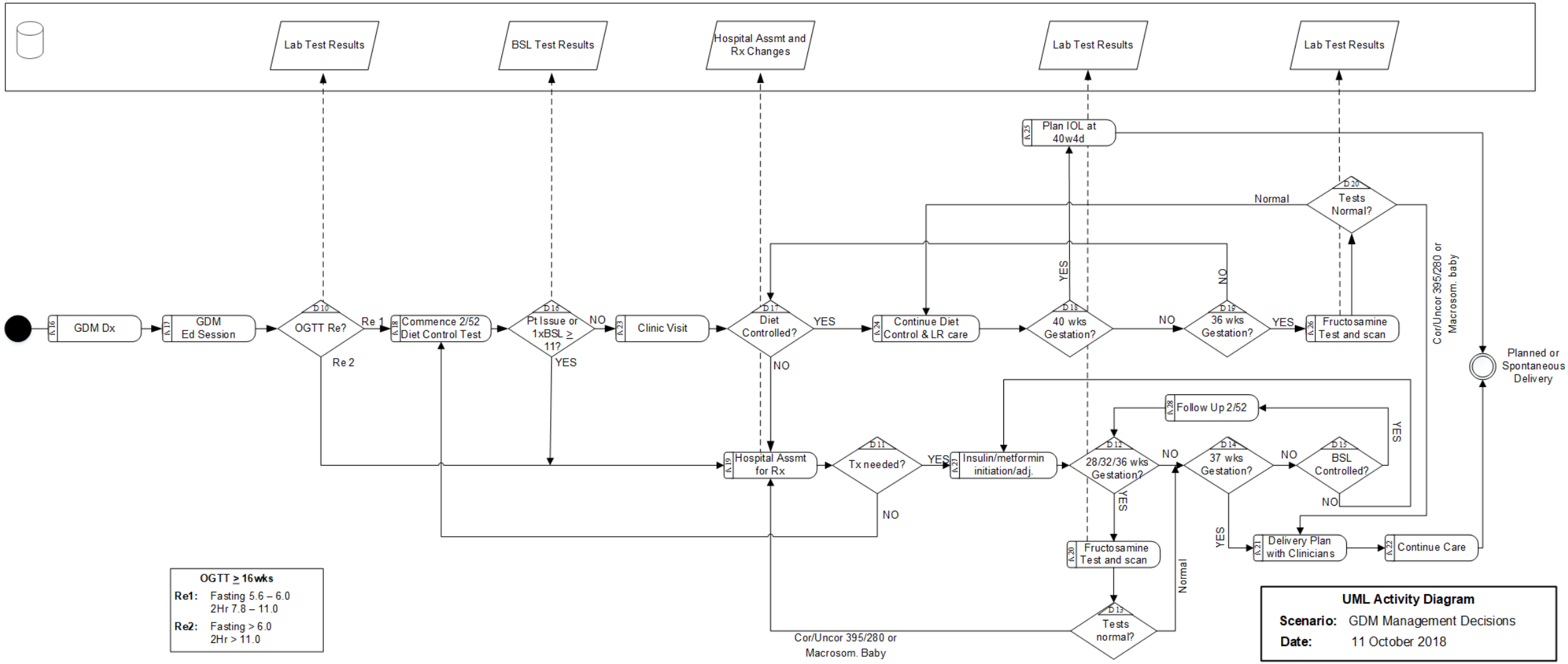

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