

Developing a business intelligence tool supporting demand & capacity forecasting in NHS therapy services

Industrial-based research proposal

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1. Background and industrial context

Industrial partner



Therapy services

- Physiotherapy
- Podiatry
- Occupational therapy
- Speech and language therapy
- Dietetics

Waiting list management tasks

- Clear backlogs
- Effective demand management
- Resource prioritisation
- Proportional urgent / routine allocation
- Understand data
- Demand & capacity (D&C) forecasting

The operational challenge

- Post-COVID backlogs
- Increasing demand
- Ageing population
- Limited staff / clinical resources
- Clinical priority vs routine targets
- Data quality
- Limited D&C resources



Support needed

- Accessing relevant data
- Operational / digital expertise
- D&C modelling including forecasting
- Simplify the complexity
- Turn data into management insights



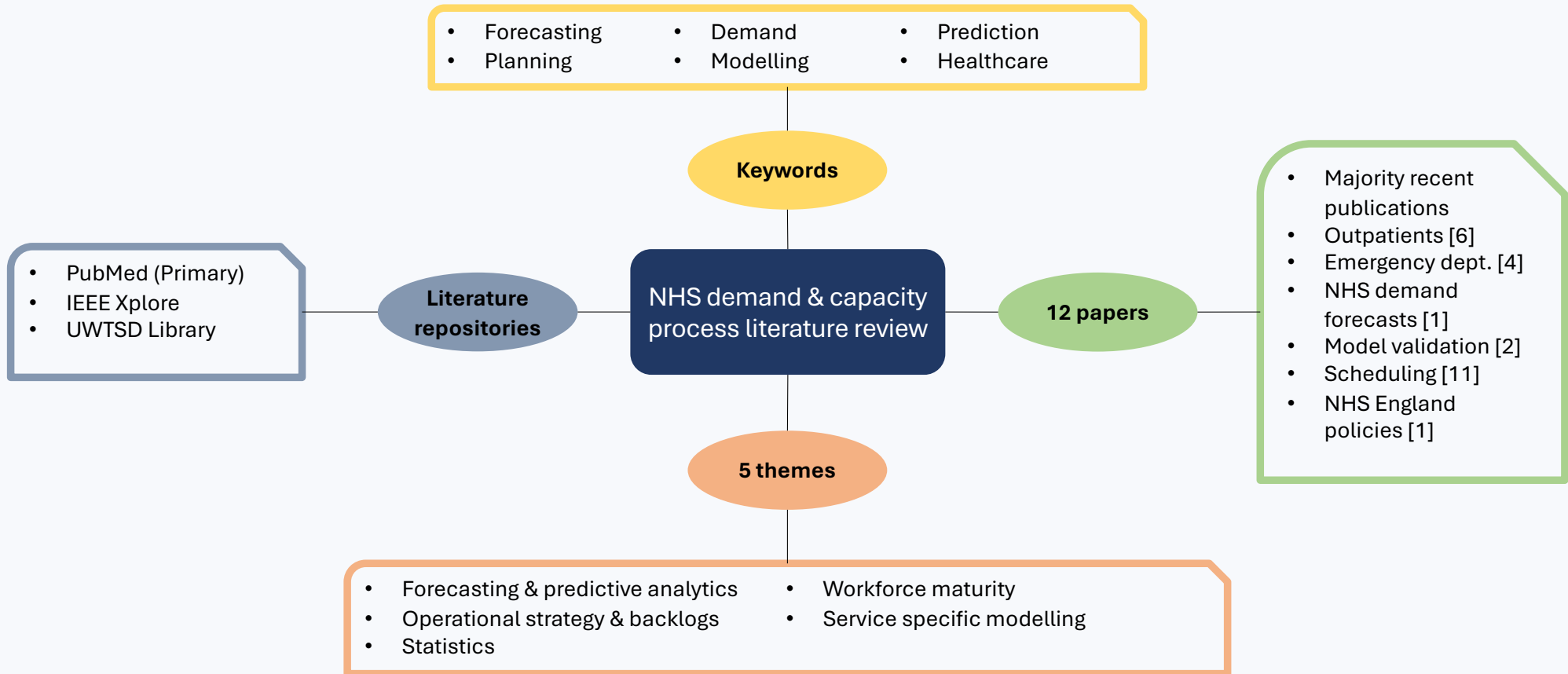
Researcher suitability

- Operational and digital experience
- D&C planning in Ophthalmology
- Corporate performance reporting
- Improving Together Framework
- Analyst role and dashboard development

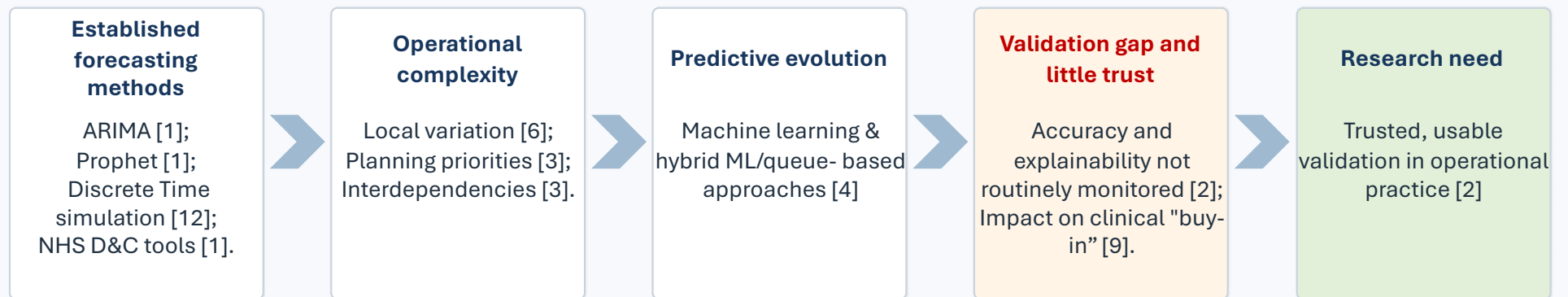
Why support matters

- Without support, services may not be able to make timely decisions
- The goal is to provide earlier warning, clear planning and more trusted evidence using demand and capacity forecasts

2. Literature review key components



3. Literature review highlighting research problem



Research problem

How can demand and capacity forecasting outputs be made accurate, transparent and operationally trusted?

4. Aim and objectives

Aim: Develop and evaluate a business intelligence solution supporting demand and capacity forecasting and forecast validation within NHS therapy services.

Objectives:

1

Improve data
collection and
automation

2

Implement suitable
forecasting
approaches

3

Evaluate accuracy
against actual
outcomes

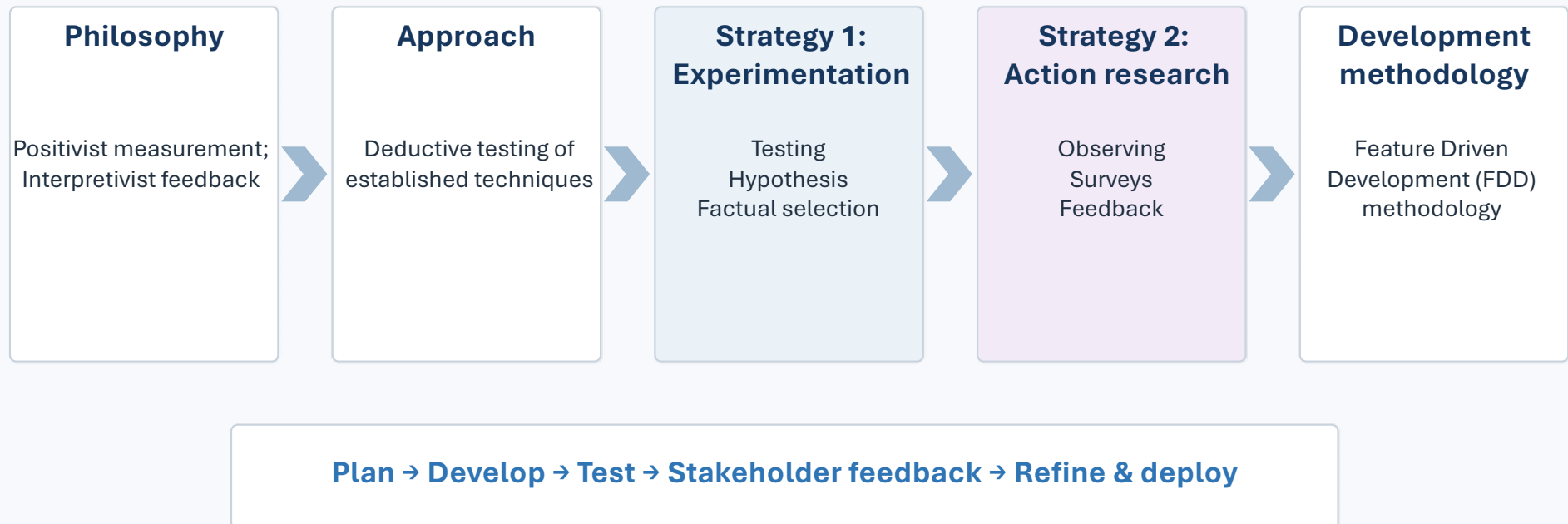
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Develop operational
dashboard with
validation feature

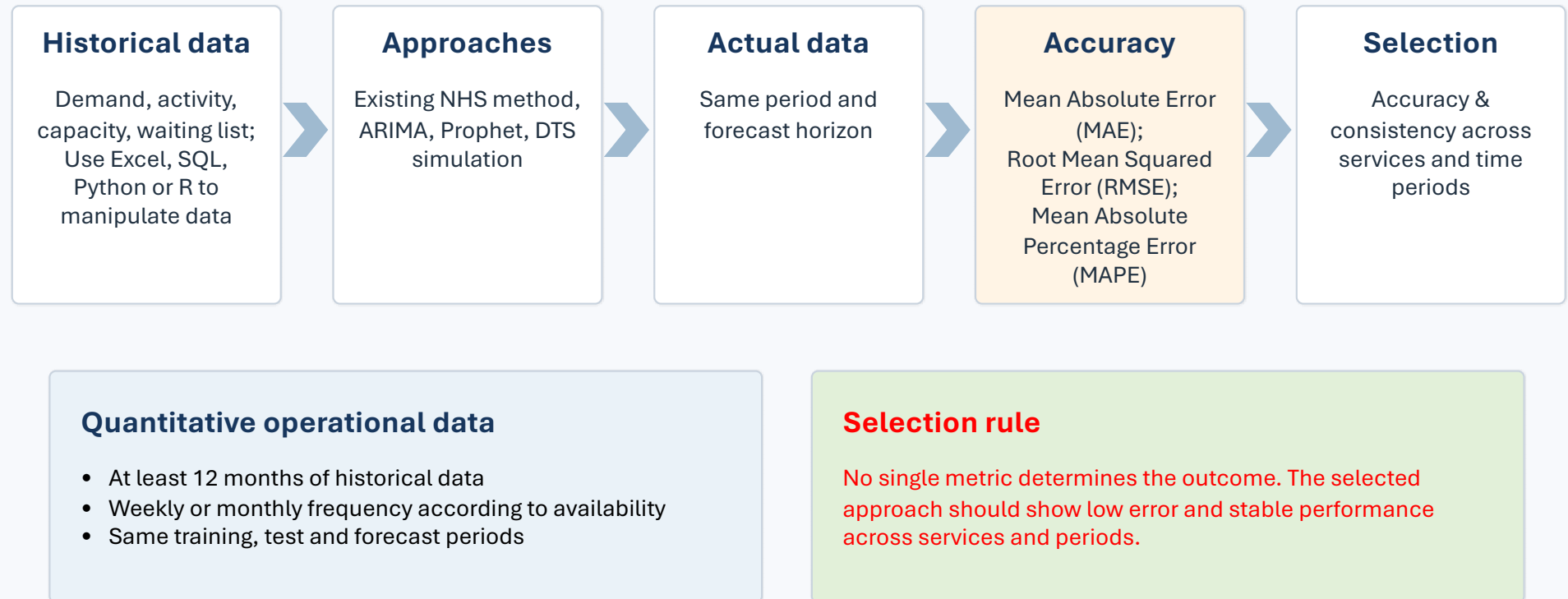
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Evaluate usability
through stakeholder
feedback

5. Research methodology



6. Strategy 1: Forecasting experiment and data analysis



7. Strategy 2: Action research and stakeholder evaluation



Survey plan

- 15–20 adult staff participants
- Baseline, post-model and post-dashboard
- Likert scale and multiple-choice items
- Open comments for thematic analysis

8. Proposed design: Power BI dashboard home page



Therapies demand and capacity forecasting dashboard

Summary

Waiting list

Demand

Capacity & activity

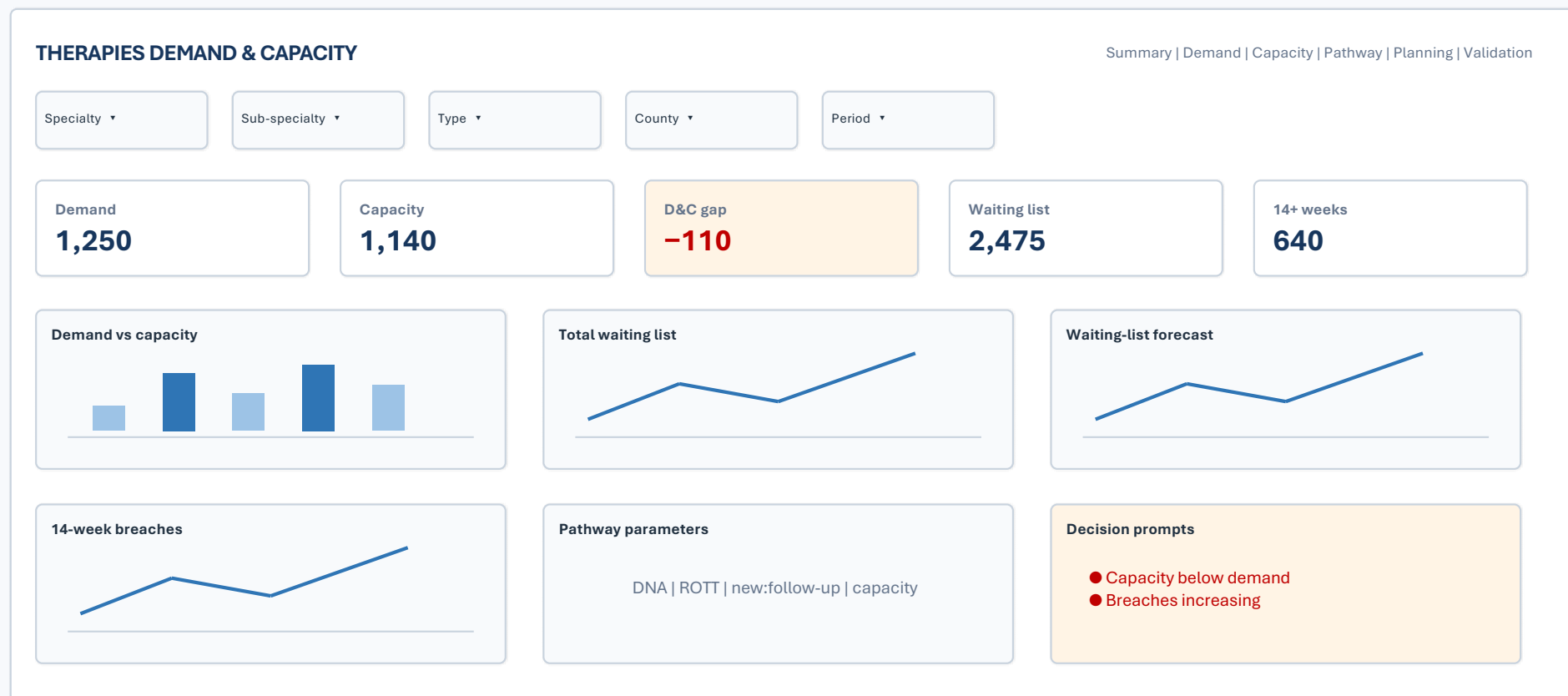
Pathway

Trajectories & planning

Validation (restricted access)



9. Proposed design: Operational summary



10. Proposed design: Restricted validation view

FORECAST VALIDATION | RESTRICTED ADMIN VIEW

MAE
60.8

RMSE
10.3

MAPE
8.7%

Model status
AMBER

Forecast vs actual



Accuracy trend over time

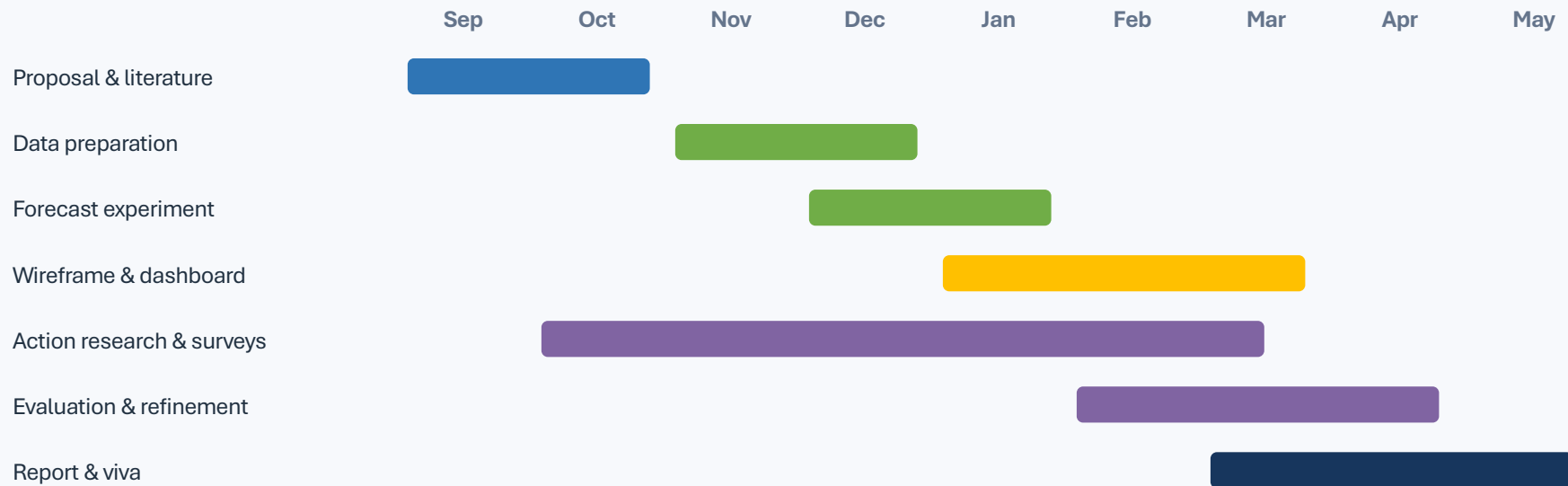


Metric	Current	Threshold	Status	Action
MAE	60.8	≤ 50	Amber	Monitor
RMSE	10.3	≤ 8	Red	Review
MAPE	8.7%	$\leq 10\%$	Green	None

Early warning logic

- repeated deterioration
- threshold breach
- model/version change

11. Project plan, resources and budget



Technology

NHS laptop, SQL Server, Power BI, Excel, R/Python and Microsoft 365

People

Therapy leads, teams, Performance, Digital, Data Science and supervisor

Budget

No additional funding expected. Main cost is staff time; existing licences and open-source tools will be used.

12. Impact, limitations and future development

Potential impact

- Earlier identification of D&C gaps
- More transparent and trusted planning
- Strengthen data skills
- Reduced manual preparation
- Repeatable monitoring across services with potential to scale

Limitations

- Data quality and completeness
- Limited validation period
- Stakeholder availability
- Time alongside full-time employment
- Transferability requires local suitability assessment

Future development

- Workforce, finance and sickness data
- Scenario simulation
- Wider planned-care rollout
- Selected AI/ML enhancements

13. Deliverable and success criteria

Minimum viable project

- One therapy service or pathway fully modelled
- Existing forecast plus one alternative approach
- Forecast validation evaluated
- Functional operational summary
- Restricted validation page

Success criteria

- Repeatable documented dataset
- At least two approaches compared
- Forecast validation implemented
- Working Power BI dashboard
- Stakeholder feedback driving refinements

The project is not just a dashboard: it is a tested route from forecast creation to validation and operational decision-making.

14. References

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