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Principles of health workforce supply modelling

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What is supply modelling?

Workforce supply:

the amount of appropriately skilled workforce available to employers.

Supply modelling:

Mathematical representations of a system to make projections of the future workforce supply.

Why use models?

- A safe environment to test ideas
- To explain and communicate

Computer models

- To make things easier
- To make things possible

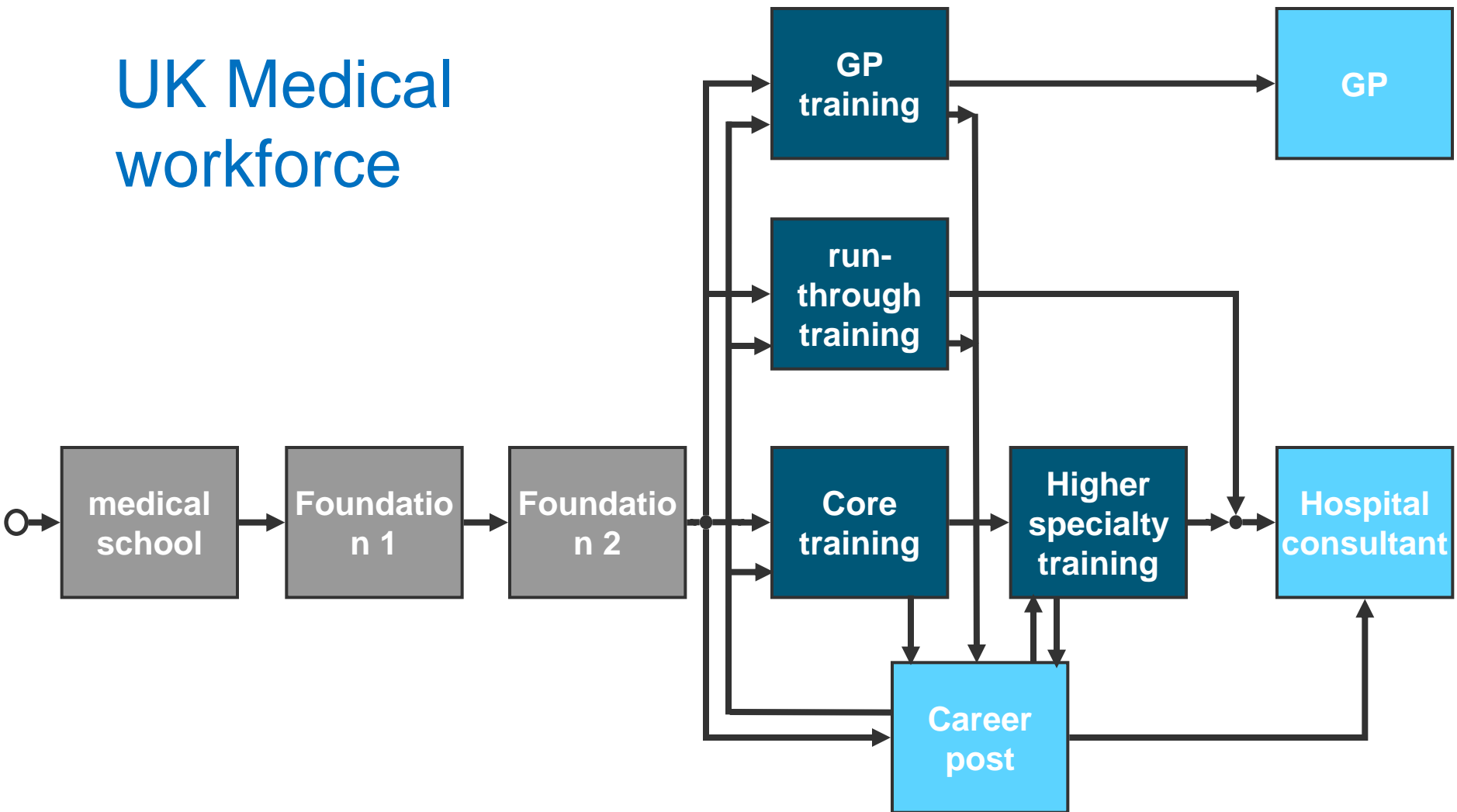
System dynamics thinking

...applied to a bath



A complex system

UK Medical workforce



Demo in Vensim

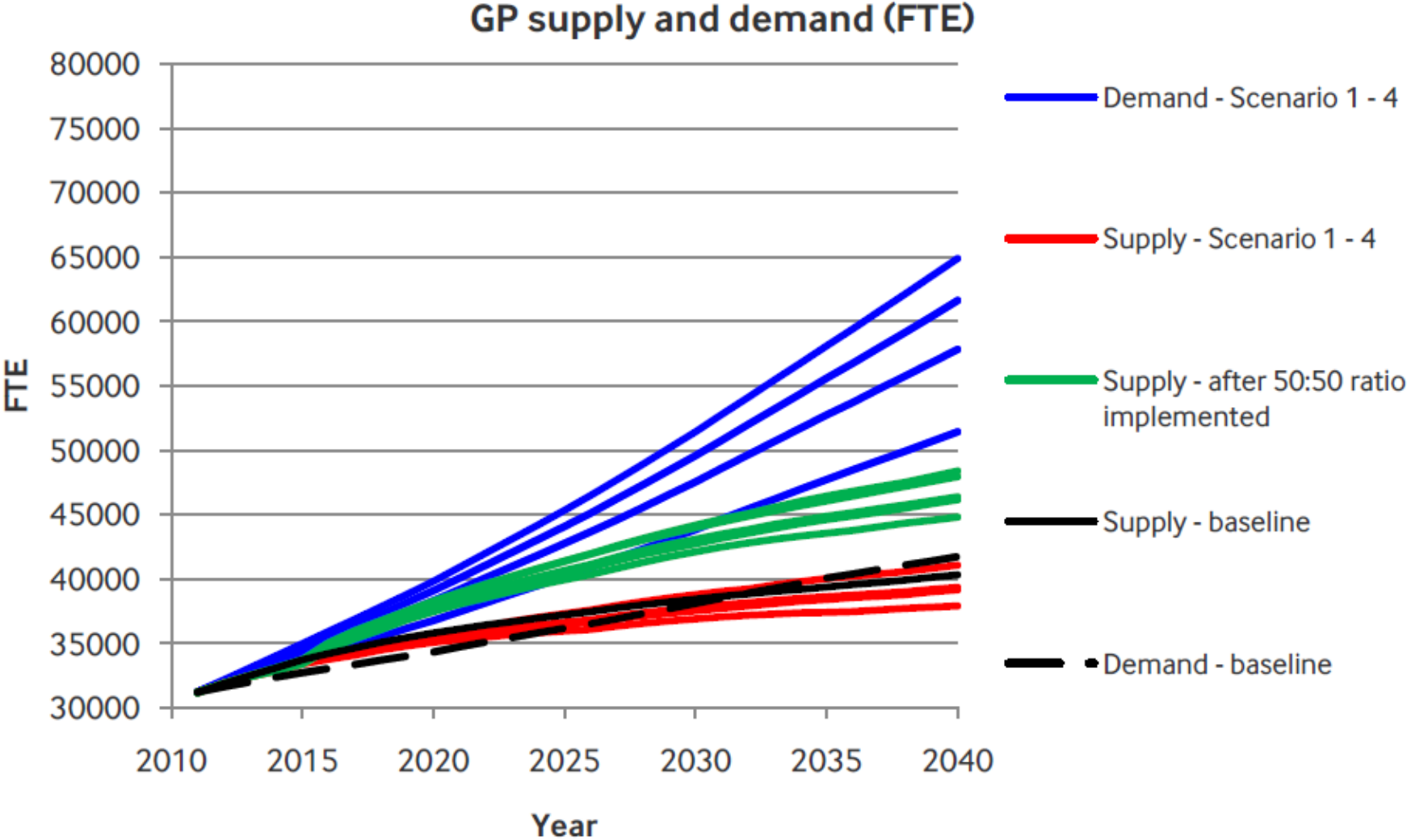
Medical model

Segmentation

Entrants to medical school
6000 joiners, segmented by

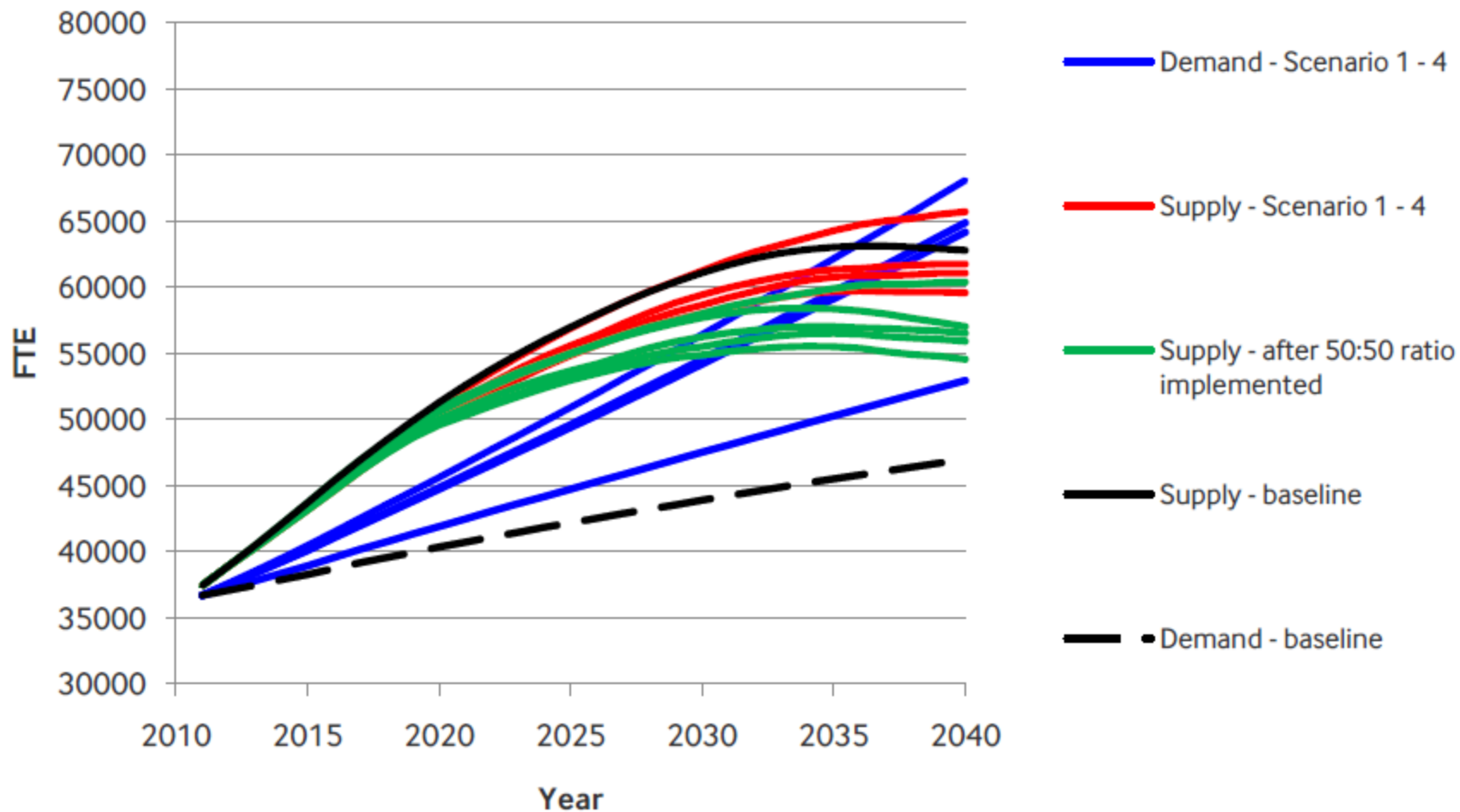
- Age (20-80)
- Gender (M/F)
- Visa status (UK, EU, Rest of World)

Outcome: family doctor (GP) projection



Outcome: specialist doctor supply

Trained hospital doctors supply and demand (FTE)



Medical modelling outcome

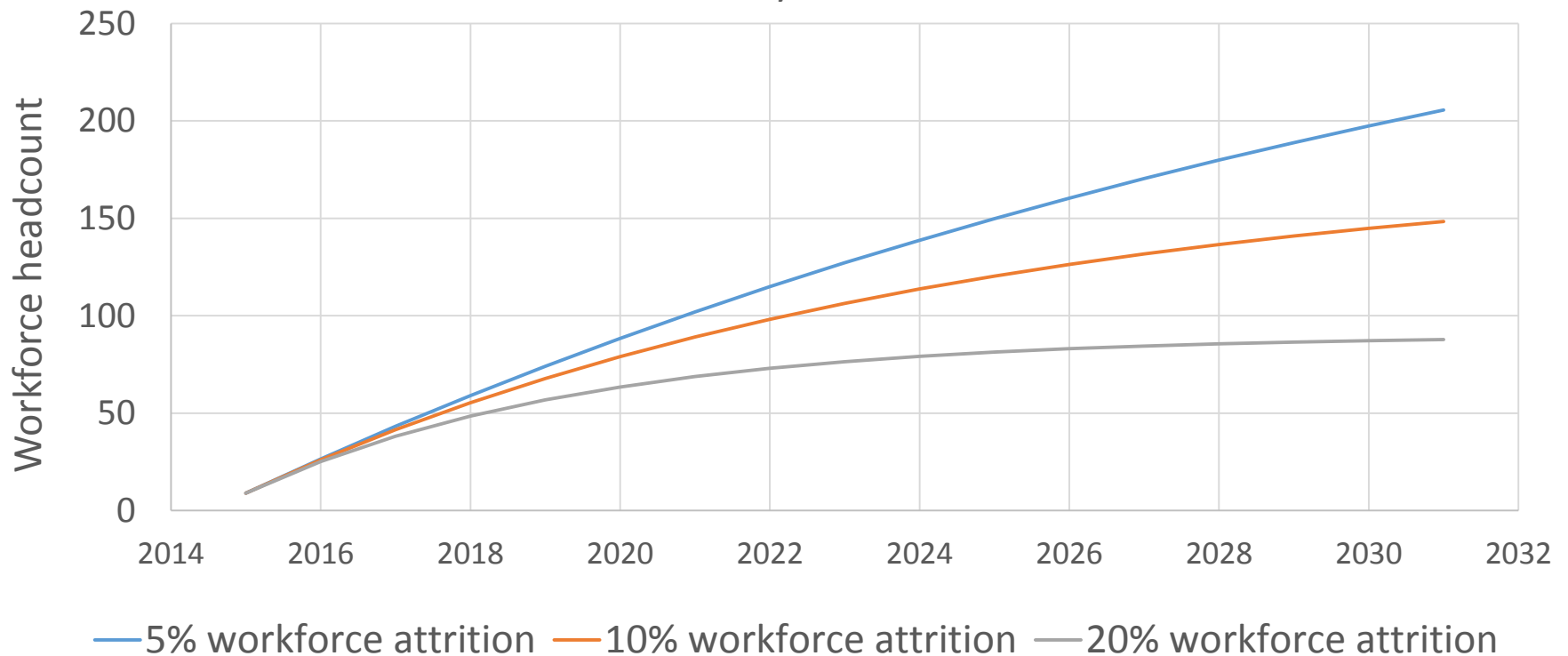
Shift training towards more primary care

2% reduction in medical school intake

£50m saving per annum.

Liberia: medical specialists projections

Projection of Specialist medical practitioners assuming a continuation of current trainee production of 18 Specialist medical practitioners staff per year



SD models

Pharmacy

Nursing

Speech & Language
Therapy

Psychiatry

Acute medicine

Geriatric medicine

Dentists

Dental care assistants

Primary care doctors

Public health specialists

Anaesthetics & ICM

Obstetrics & Gynaecology

T&O surgery

General surgery

Midwifery

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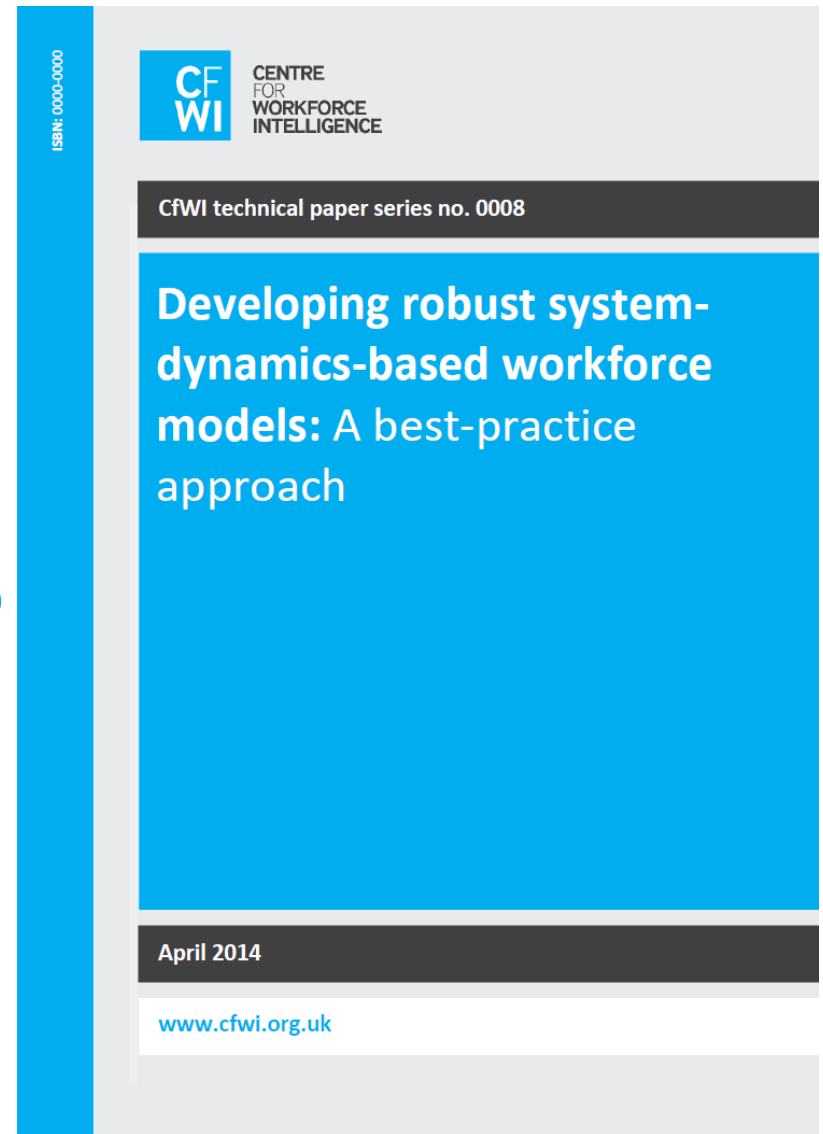
3. Exercise

Model Specification

‘Developing robust system dynamics based workforce models: A best-practice approach’

Available at:

<http://www.cfwi.org.uk/publications>



Use a model specification

Focal question

Policy levers

Boundaries (in/out of scope)

Data

Assumptions

Proposed model structure

Quality assurance



“fit for purpose”

Focal question

Define a clear question the model will answer.

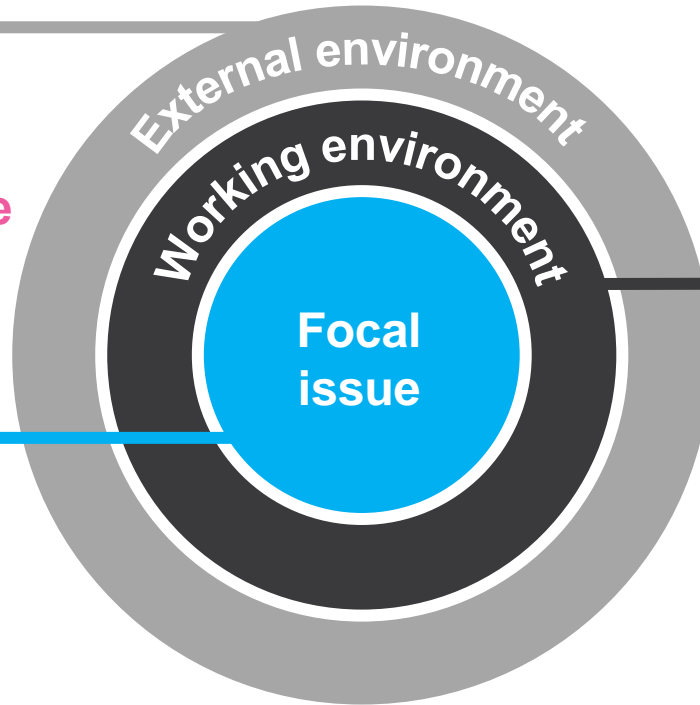
e.g. “How many nurse student commissions are needed to provide an extra 5,000 nurses by 2025?”

Sketch the graphs you want to present

Plan to tell a story with the model

Identify the policy levers

External uncertainties
Economy, Tech. etc.
What we can't influence



Health & social care
system
Transactions
**What we can
influence**

Our area of the system
Policy levers
What we can control



Boundaries: consider the scope

In scope	Out of scope
Nurse workforce	Doctor or midwife workforce
Nurse support staff	Beyond 2030
Immigration/emigration	Costs (£/\$)
Headcount and full time equivalent (FTE)	Private sector
Gender and age of workforce	Regional perspective
Public sector	

Use a model specification

Focal question

Policy levers

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Data

Availability	Quality	Granularity
<p>Sources:</p> <ul style="list-style-type: none">• Employers• Registration bodies• Professional bodies• Government statistics• Education providers• Workforce planners• Academic studies	<p>Measures:</p> <ul style="list-style-type: none">• Completeness• Validity• Accuracy• Consistency• Integrity• Timeliness	<p>Segmentation:</p> <ul style="list-style-type: none">• Age• Gender• Full time equivalent (FTE)• Profession• Type of employer• Region• Visa status / nationality• Contract type• Stage of training•many more

Minimum dataset

EU Joint Action paper

<http://healthworkforce.eu/work-package-5/>

WHO National health workforce accounts

JA Health Workforce Planning and Forecasting
D.051 – Release 1
MINIMUM PLANNING DATA REQUIREMENTS
FOR HEALTH WORKFORCE PLANNING

WP5
Deliverable
D.051



Funded by
the Health Programme
of the European Union

Version/Status	Last updated	Owner
Draft 01	2013.11.04	Italian Team
Draft 02	2013.11.08	Italian Team – integrations
Draft 02	2013.11.18	With Partners' comments and notes
Draft 03	2013.11.30	Italian Team
Draft 04	2014.01.23	Italian Team after EB comments and notes
Draft 05	2014.04.14	Text drafting_ Final version

Data collection in Europe

	SUPPLY					DEMAND	
	Labour force	Training	Retirement	Migration inflow	Migration outflow	Population	Health consumption
Profession	12	10	9	8	4		
Age	12	5	7	5	2	11	8
Head count	12	10	10	7	4	11	8
FTE	7						
Geographic area	11	6	7	5	2	9	7
Specialisation	11	8	6	6	2		
Country of first qualification	6	3	3	5	2		
Gender	10						

www.healthworkforce.eu

Assumptions

Our job is to predict the future, sensible assumptions are necessary

Solutions:

- Collect data/ intelligence
- Elicit unknowns
- Recognise the uncertainty

Proposed a model structure

Choose type of model - System dynamics
(SD)

Draw a diagram to represent the model

Choose relevant software

Share model specification with experts

Offer corrections

Produce data

Win their confidence in the work

Use a model specification

Focal question

Policy levers

Boundaries (in/out of scope)

Data

Assumptions

Proposed model structure

Quality assurance



“fit for purpose”

Quality assurance

Assess the risk of a mistake in the model, and the relevant level of checks.

Have someone else review the model

Eg consider: Mass balance, unit analysis

Use a model specification

Focal question

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“fit for purpose”

EXERCISE POLICY LEVERS

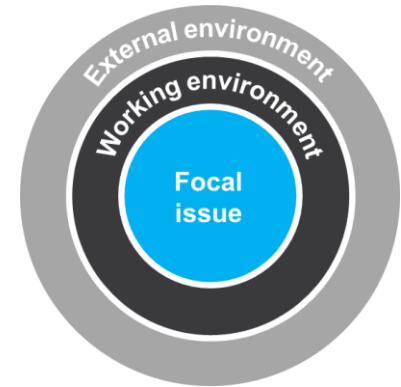
Exercise

At your tables, identify a workforce with current issues and future risks to supply.

(3 mins)

Exercise

Identify the policy levers



*Policy levers are policies that you have **control** over and impact the workforce supply. You may also include factors that you have an **influence** on.*

Exercise

For each policy lever, how might it be incorporated into a supply model?

What parameters would need to be defined in the supply model?

What data and segmentation would you need?

What are the complications?

Tables report back

Describe one policy lever you discussed