Robust workforce planning: dealing with uncertainty

Dr Graham Willis – Head of Research and Development

The CfWI produces quality intelligence to inform better workforce planning that improves people’s lives
1. Challenges of health workforce modelling

2. Robust workforce planning framework

3. System dynamics modelling

4. Translation into policy and decision-making

5. Where next?
Challenges of health workforce planning

- Scale of health sector in England
  - 1.4 million people
  - 140,000 Doctors
  - 370,000 Nurses

- NHS reforms
  - New structures, organisations, processes

- Affordability challenge

- Quality challenge
The most likely future isn’t

- Complex factors
  - Economic outlook
  - Population growth, ageing and health
  - Who delivers care and where?
  - Part time working
  - Changing state pension age

- Future cannot be predicted accurately
- Understand the critical uncertainties
- Look for most robust policy across challenging futures
Contents

1. The challenge of workforce planning in the health sector
2. Robust workforce planning framework
3. System dynamics modelling
4. Translation into policy and decision-making
5. Where next?
Robust workforce planning framework

- **Horizon scanning** feeds into **scenario generation** (framing the uncertainty) and **workforce modelling**
- **Policy analysis** shows the effectiveness of policy interventions across the range of scenarios
- High degree of **stakeholder involvement** at every stage – including model development – workforce, trainees, employers, policy makers, lay people
Unstructured to structured complexity

Horizon scanning

Structured risks and issues

Scenario generation

Outline scenarios

Workforce modelling

Structured complexity

Unstructured complexity

Scope

Identify future risks, issues and Big Picture Challenges

Causal maps

Pre-determined factors

High impact, high uncertainty variables

Emerging stories

Critical uncertainties

Assumptions

Data

Policy levers

Scenario stories describing challenging futures

Unstructured to structured complexity

Scope

Stakeholders

Identify future risks, issues and Big Picture Challenges

Causal maps

Critical uncertainties

Pre-determined factors

High impact, high uncertainty variables

Emerging stories

Detailed, quantified scenarios for modelling
Span of control

External uncertainties
Driving forces
TEEPSE
What we have no
Influence over

Our area of the system
Key question of concern
Policy levers
What we can control

Focal issue

Health & social care system
Transactions
Factors and issues
What we can influence

External environment
Working environment
Degree of influence
Higher
Lower

What we have no influence over

What we can influence
Bringing it together

Challenging futures outside our control

Narrative scenarios

Parameters that are intrinsically uncertain

Delphi workshop to quantify scenarios for modelling

Policy responses within our control

System dynamics model

Supply and demand without policy action

Assess impact of each policy on supply and demand

Policy levers to investigate

ROBUST WORKFORCE MODELLING

Area of interest

Supply and demand gap

A   B   C

High

Low

Draft
Contents
1. The challenge of workforce planning in the health sector
2. Robust workforce planning framework
3. System dynamics modelling
4. Translation into policy and decision-making
5. Where next?
System dynamics is the key

- Better understanding – dynamic behaviour of system over time
- Simplify complexity – rich picture of causality, feedback and delays
- High stakeholder involvement – process provides as much value as end-product
- Robust decisions – avoid policies that lead to unexpected consequences
Stock and flow model

Stakeholders
- DH’s Workforce Data and Analysis Team
- Health and Social Care Information Centre
- BMA
- GMC and specific deaneries
- UCAS
- NHS Pensions
- Medical project reference group
- National road shows

* Based on the sum of inflows: course drop-outs accounted for at the end of the course
Model development

- Segmented by age & gender
- Can include country of origin/qualification, skill & competences
- Includes attrition, delays, exits & returns, migration, full/part-time working
Supply and demand

**Demand**
- Future needs
  - Need (now)
  - Service provided (now)
  - Proportion need met by current service
  - Need (future)
- Population
  - ONS population forecasts
- ‘DEMAND’

**Supply**
- Future capability
  - Efficient & effectiveness of the future system, including technology & models of care
- Future service
  - Appropriate level of service to meet needs, accounting for economic realities

**Active workforce**
- Number completing training
- Number entering workforce
- Attrition
- Temporary leavers
- Inward migration control
- Intake from outside England
- Total intake

**Workforce**
- Number in workforce (now)
- Average hrs per wk (future)
- Time spent on service (now)
- Retirement age (limit & actual)

**Education & training**
- Number of students/trainees
- Training delay
- Length of training
- Time spent contributing to service

**Key**
- Relatively knowable
- Policy levers
- Intrinsically uncertain
Sensitivity & uncertainty analysis

- Independent CfWI testing
- Comparison with other models
- Review with relevant stakeholders
- Sensitivity & uncertainty analysis
1. Challenges of health workforce modelling
2. Robust workforce planning framework
3. System dynamics modelling
4. Translation into policy and decision-making
5. Where next?
Medical and Dental Student Intakes

- Review of current intakes against likely future requirements
- Insight provided into what policies work best
- High degree of collaboration, including senior policy makers
- Significant decisions made
  2 percent reduction in medical school intakes for one year
  No change to dental school intakes due to data quality issues
  Rolling cycle of reviews
- See
Example: GP and consultant ratio

<table>
<thead>
<tr>
<th>Year</th>
<th>Demand</th>
<th>Baseline</th>
<th>Supply</th>
<th>Supply after: 50:50 GP ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2030</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2035</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2040</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Impact of policies across scenarios

- Seven-day working
- Changes in skill mix
- Increased retirement age
- Non-EEA medical student intake varies
- 50:50 ratio of entry-level GP to hospital posts achieved
- GP training increases to four years

<table>
<thead>
<tr>
<th>Scenarios</th>
<th>Policies</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Key:
- **Pink**: Negative
- **Neutral**: Neutral
- **Green**: Positive

Most robust
Policy analysis

With cost included **policy 1** is much cheaper & nearly as effective.

**Policy 2** best at reducing supply/demand discrepancy.
Contents

1. Challenges of health workforce modelling
2. Robust workforce planning framework
3. System dynamics modelling
4. Translation into policy and decision-making
5. Where next?
Framework refresh

- Systems thinking end-to-end
- Re-usable building blocks
- Portfolio of scenarios and policies
- Workforce skills & competencies
- Multiple professions/care pathways
Dashboards

1. **MS Excel tool** – comparative tool for health and social care workforces, deep resource, file size and update trade offs

2. **Web comparison tool** – interactive dashboard, comparative analysis and information, highly accessible to a wider audience, exportable for offline use, easy to update

3. **Interactive web dashboard** – user is able to alter assumptions, examine scenarios, highly accessible, key part of CfWI supply and demand modelling presentation, easy to update

4. **Apps** – currently developing a suite of apps for multiple platforms (iPad, iPhone, android, etc)
Proposed future work

- Strategic view of the entire health and social care workforce
- New system dynamics models and workforce reviews
  - Whole health and social care
  - Medical specialties
  - Health professions
  - Social care
- Partnerships with other health workforce agencies
- Modelling at the regional & local level
- Commissioned projects
Robust workforce planning: dealing with uncertainty

Dr Graham Willis – Head of Research and Development

The CfWI produces quality intelligence to inform better workforce planning that improves people’s lives