Performance-Based Contracting for Outpatient Medical Services

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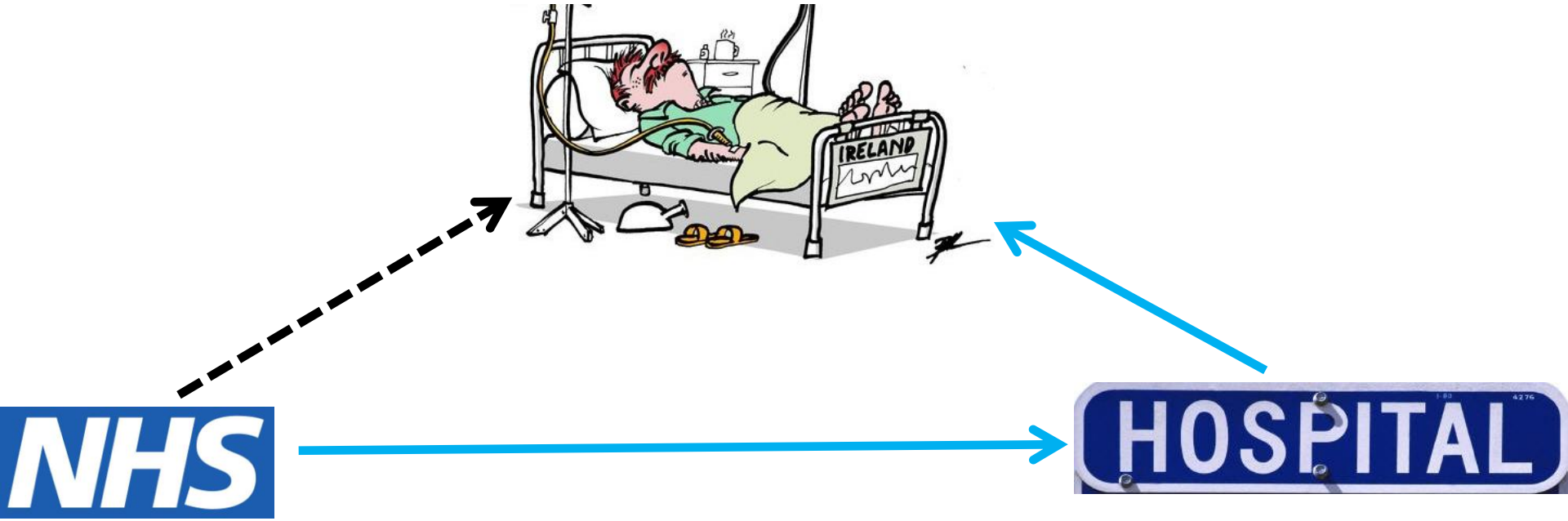
Problem Descriptions



- Patients make outpatients appointments via **Choose and Book**.
- The NHS contracts hospitals to treat patients based on **PbR**.
- Hospitals must meet the **18-week target**.

Research Questions

- ❑ How should the NHS design contracts?

- ❑ How should hospitals allocate their resource between same-day, advance-flexible and advance-dedicated patients?

- ❑ Is it possible to design contracts to coordinate the supply chain when information is either symmetric or asymmetric?

✓Our methodology is the **principal and agent model** where the principal is the **NHS,** and the agent is the **hospital**.

Mathematical Models

$$
\begin{cases}
\min\limits_{T} \left\{ \Pi_p \equiv pT(A^H, Z^H) + (1-p)T(A^L, Z^L) \right\} \\
\text{s.t.} \\
\mathrm{E}[W_{\mathrm{q}}^{\mathrm{t}}(A^t, Z^t)] \le MA^t, t = H, L, \\
\Pi_a^{tt} \equiv T(A^t, Z^t) - o^t E[(D_0 - C + A^t)^+] - b\lambda(1-\theta)\Pr(L_q(A^t, Z^t) \ge Z^t) \ge 0, t = H, L, \\
\Pi_a^{HH} \ge \Pi_a^{HL} \\
\Pi_a^{LL} \ge \Pi_a^{LH}.
\end{cases}
$$

$$
\max_{A,Z} \begin{pmatrix} \Pi_a(A,Z) \equiv T(A,Z) \\ -o^t E\left[(D_0 + A - C)^+\right] - b\lambda(1-\theta)\Pr(L_q(A,Z) \ge Z) \end{pmatrix}
$$

$$
\text{s.t.} \quad \lambda\theta < A \le C,
$$

$$
Z \ge 0.
$$

Implement First- and Second-Best Solutions

	Symmetric	Asymmetric
Block	✗	✗
Simple PbR	✗	✗
Current PbR	✓	✗
Nonlinear PBC (special case)	✓	✓
Nonlinear PBC (general case)	✓	?