Resident doctor allocation

William Pettersson

What are resident doctors, and why do we allocate them?

Why did resident doctors strike and what are they paid?

14 July 2025
Updated 30 July 2025

Resident doctors in England are heading back to work after a five-day walkout over pay.

They say they haven't had a "credible pay deal" for 2025-2026, but Health Secretary Wes Streeting argues the strike is "unreasonable" after substantial pay rises in recent years.

Figure 1: From https://www.bbc.co.uk/news/articles/cn0qyl4ljjko


Why did resident doctors strike and what are they paid?

14 July 2025
Updated 30 July 2025

Resident doctors in England are heading back to work after a five-day walkout over pay.

They say they haven't had a "credible pay deal" for 2025-2026, but Health Secretary Wes Streeting argues the strike is "unreasonable" after substantial pay rises in recent years.

Figure 1: From https://www.bbc.co.uk/news/articles/cn0qyl4ljjko

1. Doctors in residency, or resident doctors, are doctors who have completed their education as a medical practitioner and are working on a specialisation or becoming a GP (or similar).
2. Resident doctors used to be called junior doctors in the UK, but this was recently changed by the BMA.

'The NHS can't tell me where my job will be'

Jayne Evans is one of hundreds of "placeholder" resident doctors who do not know where they will be based

Charlie Haynes
BBC Investigations, East Midlands

7 April 2025 · 431 Comments

Jayne Evans has completed four years at medical school in London - but says she is still being left in the dark about where her first permanent NHS position will be.

Figure 2: From https://www.bbc.co.uk/news/articles/c045l5r467ko


'The NHS can't tell me where my job will be'

Jayne Evans is one of hundreds of "placeholder" resident doctors who do not know where they will be based

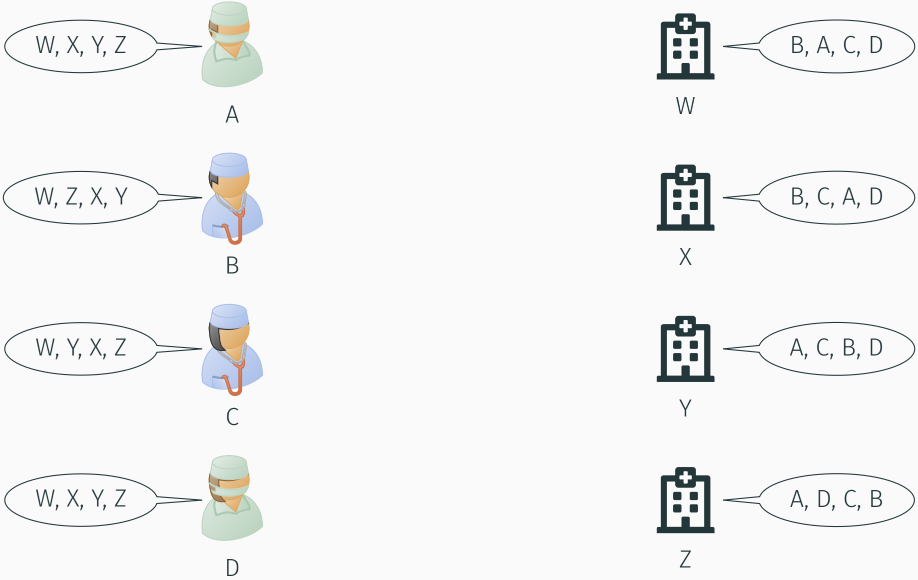
Charlie Haynes
BBC Investigations, East Midlands

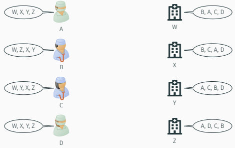
7 April 2025 · 831 Comments

Jayne Evans has completed four years at medical school in London - but says she is still being left in the dark about where her first permanent NHS position will be.

Figure 2: From https://www.bbc.co.uk/news/articles/c045l5r467ko

1. Doctors have to apply to the UK Foundation Scheme.
2. Each doctor will rank some number of programmes at hospitals around the UK.
3. Similarly, each hospital will rank the doctors, often based on results of exams or interviews.


W, X, Y, Z
A
W, Z, X, Y
B
W, Y, X, Z
C
W, X, Y, Z
D
B, A, C, D
W
B, C, A, D
X
A, C, B, D
Y
A, D, C, B
Z



1. Each doctor and hospital has a preference list — a list of their preferences, with their more-preferred options appearing earlier.

$$
\begin{aligned}
d_a &: h_w h_x h_y h_z \\
d_b &: h_w h_z h_x h_y \\
d_c &: h_w h_y h_x h_z \\
d_d &: h_w h_x h_y h_z
\end{aligned}
\qquad\qquad
\begin{aligned}
h_w &: d_b d_a d_c d_d \\
h_x &: d_b d_c d_a d_d \\
h_y &: d_a d_c d_b d_d \\
h_z &: d_a d_d d_c d_b
\end{aligned}
$$

$$
\begin{array}{lll}
d_a : h_w h_x h_y h_z & \quad & h_w : d_b d_a d_c d_d \\
d_b : h_w h_z h_x h_y & & h_x : d_b d_c d_a d_d \\
d_c : h_w h_y h_x h_z & & h_y : d_a d_c d_b d_d \\
d_d : h_w h_x h_y h_z & & h_z : d_a d_d d_c d_b
\end{array}
$$

1. We will write the agents and their preference lists like this.

$$
\begin{aligned}
d_a &: h_w h_x h_y h_z \\
d_b &: h_w h_z h_x h_y \\
d_c &: h_w h_y h_x h_z \\
d_d &: h_w h_x h_y h_z
\end{aligned}
\qquad\qquad
\begin{aligned}
h_w(1) &: d_b d_a d_c d_d \\
h_x(2) &: d_b d_c d_a d_d \\
h_y(1) &: d_a d_c d_b d_d \\
h_z(2) &: d_a d_d d_c d_b
\end{aligned}
$$

$$
\begin{array}{lcr}
d_a : h_w h_x h_y h_z & \qquad & h_w(1) : d_b d_a d_c d_d \\
d_b : h_w h_z h_x h_y & & h_x(2) : d_b d_c d_a d_d \\
d_c : h_w h_y h_x h_z & & h_y(1) : d_a d_c d_b d_d \\
d_d : h_w h_x h_y h_z & & h_z(2) : d_a d_d d_c d_b
\end{array}
$$

1. Hospitals can generally accept multiple doctors.
2. What happens if we take a greedy approach?

$$
\begin{aligned}
d_a &: \underline{h_w} h_x h_y h_z \\
d_b &: h_w h_z h_x h_y \\
d_c &: h_w h_y h_x h_z \\
d_d &: h_w h_x h_y h_z
\end{aligned}
\qquad\qquad
\begin{aligned}
h_w(1) &: d_b \underline{d_a} d_c d_d \\
h_x(2) &: d_b d_c d_a d_d \\
h_y(1) &: d_a d_c d_b d_d \\
h_z(2) &: d_a d_d d_c d_b
\end{aligned}
$$

$$
\begin{array}{lcr}
d_a : \underline{h_w} h_x h_y h_z & \qquad & h_w(1) : d_b \underline{d_a} d_c d_d \\
d_b : h_w h_z h_x h_y & & h_x(2) : d_b d_c d_a d_d \\
d_c : h_w h_y h_x h_z & & h_y(1) : d_a d_c d_b d_d \\
d_d : h_w h_x h_y h_z & & h_z(2) : d_a d_d d_c d_b
\end{array}
$$

1. We denote matchings by underlining the selected doctor / hospital pair.
2. So doctor a is matched with hospital w, as that is doctor a’s first choice.

$$
\begin{aligned}
d_a &: \underline{h_w} h_x h_y h_z \\
d_b &: h_w \underline{h_z} h_x h_y \\
d_c &: h_w h_y h_x h_z \\
d_d &: h_w h_x h_y h_z
\end{aligned}
\qquad\qquad
\begin{aligned}
h_w(1) &: d_b \underline{d_a} d_c d_d \\
h_x(2) &: d_b d_c d_a d_d \\
h_y(1) &: d_a d_c d_b d_d \\
h_z(2) &: d_a d_d d_c \underline{d_b}
\end{aligned}
$$

$$
\begin{array}{lcr}
d_a : \underline{h_w} h_x h_y h_z & \qquad & h_w(1) : d_b \underline{d_a} d_c d_d \\
d_b : h_w \underline{h_z} h_x h_y & & h_x(2) : d_b d_c d_a d_d \\
d_c : h_w h_y h_x h_z & & h_y(1) : d_a d_c d_b d_d \\
d_d : h_w h_x h_y h_z & & h_z(2) : d_a d_d d_c \underline{d_b}
\end{array}
$$

1. We cannot assign doctor b to hospital w as w is full, so we assign doctor b to hospital z

$$
\begin{aligned}
d_a &: \underline{h_w} h_x h_y h_z \\
d_b &: h_w \underline{h_z} h_x h_y \\
d_c &: h_w \underline{h_y} h_x h_z \\
d_d &: h_w \underline{h_x} h_y h_z
\end{aligned}
\qquad\qquad
\begin{aligned}
h_w(1) &: d_b \underline{d_a} d_c d_d \\
h_x(2) &: d_b d_c d_a \underline{d_d} \\
h_y(1) &: d_a \underline{d_c} d_b d_d \\
h_z(2) &: d_a d_d d_c \underline{d_b}
\end{aligned}
$$

$$\begin{array}{ll} d_a : \underline{h_w} h_x h_y h_z & h_w(1) : d_b \underline{d_a} d_c d_d \\ d_b : h_w \underline{h_z} h_x h_y & h_x(2) : d_b d_c d_a \underline{d_d} \\ d_c : h_w \underline{h_y} h_x h_z & h_y(1) : d_a \underline{d_c} d_b d_d \\ d_d : h_w \underline{h_x} h_y h_z & h_z(2) : d_a d_d d_c \underline{d_b} \end{array}$$

1. We cannot assign doctor c to hospital w as w is full, so we assign doctor c to hospital y
2. And then doctor d is assigned to hospital x

$$
\begin{aligned}
d_a &: \underline{h_w} h_x h_y h_z \\
d_b &: h_w \underline{h_z} h_x h_y \\
d_c &: h_w \underline{h_y} h_x h_z \\
d_d &: h_w \underline{h_x} h_y h_z
\end{aligned}
$$

$$
\begin{aligned}
h_w(1) &: d_b \underline{d_a} d_c d_d \\
h_x(2) &: d_b d_c d_a \underline{d_d} \\
h_y(1) &: d_a \underline{d_c} d_b d_d \\
h_z(2) &: d_a d_d d_c \underline{d_b}
\end{aligned}
$$

$d_a : \underline{h_w} h_x h_y h_z$	$h_w(1) : d_b \underline{d_a} d_c d_d$
$d_b : h_w \underline{h_z} h_x h_y$	$h_x(2) : d_b d_c d_a \underline{d_d}$
$d_c : h_w \underline{h_y} h_x h_z$	$h_y(1) : d_a \underline{d_c} d_b d_d$
$d_d : h_w \underline{h_x} h_y h_z$	$h_z(2) : d_a d_d d_c \underline{d_b}$

1. Note that the doctors all have either their first or second preference, while two hospitals have their worst choice.
2. Also consider doctor b and hospital w – doctor b would prefer to be at hospital w, and hospital w would prefer to have doctor b.
3. And then doctor d is assigned to hospital x
4. Doctor b and hospital w form a blocking pair.

Blocking pair
Given a matching problem, and a selected matching, a pair d, h is a blocking pair if:

- d is unmatched, or prefers h to their currently matched hospital, and
- h is under capactiy, or prefers d to at least one of their currently matched doctors.

Stable matching
Given a matching problem, a matching is stable if there are no blocking pairs.

A stable matching can be found in polynomial time using e.g. the Gale-Shapley algorithm.

$$
\begin{array}{ll}
d_a : h_w \underline{h_x} h_y h_z & h_w(1) : \underline{d_b} d_a d_c d_d \\
d_b : \underline{h_w} h_z h_x h_y & h_x(2) : d_b d_c \underline{d_a d_d} \\
d_c : h_w \underline{h_y} h_x h_z & h_y(1) : d_a \underline{d_c} d_b d_d \\
d_d : h_w \underline{h_x} h_y h_z & h_z(2) : d_a d_d d_c d_b
\end{array}
$$

A stable matching can be found in polynomial time using e.g. the Gale-Shapley algorithm.

$$
\begin{array}{ll}
d_a : h_w \underline{h_x} h_y h_z & h_w(1) : \underline{d_b} d_a d_c d_d \\
d_b : \underline{h_w} h_z h_x h_y & h_x(2) : d_b d_c \underline{d_a d_d} \\
d_c : h_w \underline{h_y} h_x h_z & h_y(1) : d_a \underline{d_c} d_b d_d \\
d_d : h_w \underline{h_x} h_y h_z & h_z(2) : d_a d_d d_c d_b
\end{array}
$$

1. Each hospital “tentatively accepts” offers from doctors that are agreeable: either the hospital has space to accept a new doctor, or is happy to reject a doctor they have tentatively accepted and instead accept the new proposing doctor.
2. If a doctor has been rejected, they mark that hospital as unacceptable.
3. Once all doctors either have a tentative acceptance, or have no more acceptable hospitals to propose to, all tentative acceptances are turned into confirmed acceptances, and the matching is formed.
4. There can be multiple different stable matchings.
5. Some are “better” for the doctors, while others are “better” for the hospitals.

There can be different stable matchings, however:

Rural hospitals theorem

- The set of assigned doctors is always the same (i.e., if a doctor is not assigned in one stable matching, they're not assigned in any stable matching)
- If a hospital has unassigned space, then in any stable matching said hospital is always assigned the exact same set of doctors

- Some doctors are “equally good”, and doctors may rank hospitals as “equally good” (also known as ties)
- Doctors also aren’t required to rank every single hospital

$$d_a : h_w[h_x h_y]h_z$$

In this preference list, h_w is the rank-1 choice of d_a, h_x and h_y are both rank-2 choices of d_a, and h_z is the rank-3 choice of d_1.

Note that the rural hospitals theorem doesn’t hold if ties are present.

As a result of having ties and “incomplete lists”, different stable matchings may have different sizes, and people generally want a largest stable matching.

Finding such a matching is NP-hard.

Integer linear programming

$$
\begin{aligned}
\max \sum_{i=1}^{n_d} \sum_{j \in H(i)} x_{ij} & \\
\text{s.t.} \sum_{j \in H(i)} x_{ij} \leq 1, & \qquad i \in \{1, \dots, n_d\}, \\
\sum_{i \in D(j)} x_{ij} \leq c_j, & \qquad j \in \{1, \dots, n_h\}, \\
c_j \left(1 - \sum_{q \in H_j^{\leq}(i)} x_{iq}\right) \leq \sum_{p \in D_i^{\leq}(j)} x_{pj}, & \qquad i \in \{1, \dots, n_d\}, j \in H(i), \\
x_{ij} \in \{0, 1\} & \qquad i \in \{1, \dots, n_d\}, j \in H(i)
\end{aligned}
$$

$$
\begin{aligned}
\max \sum_{i=1}^{n_d} \sum_{j \in H(i)} x_{ij} & \\
\text{s.t.} \sum_{j \in H(i)} x_{ij} \le 1, & \qquad i \in \{1, \dots, n_d\}, \\
\sum_{i \in D(j)} x_{ij} \le c_j, & \qquad j \in \{1, \dots, n_h\}, \\
c_j \left(1 - \sum_{q \in H_j^{\le}(i)} x_{iq} \right) \le \sum_{p \in D_i^{\le}(j)} x_{pj}, & \qquad i \in \{1, \dots, n_d\}, j \in H(i), \\
x_{ij} \in \{0, 1\} & \qquad i \in \{1, \dots, n_d\}, j \in H(i)
\end{aligned}
$$

1. The notation will be explained over the next few slides.

$$
\begin{aligned}
\max \sum_{i=1}^{n_d} \sum_{j \in H(i)} x_{ij} & \\
\text{s.t.} \sum_{j \in H(i)} x_{ij} \leq 1, & \qquad i \in \{1, \dots, n_d\}, \\
\sum_{i \in D(j)} x_{ij} \leq c_j, & \qquad j \in \{1, \dots, n_h\}, \\
c_j \left(1 - \sum_{q \in H_j^{\leq}(i)} x_{iq} \right) \leq \sum_{p \in D_i^{\leq}(j)} x_{pj}, & \qquad i \in \{1, \dots, n_d\}, j \in H(i), \\
x_{ij} \in \{0, 1\} & \qquad i \in \{1, \dots, n_d\}, j \in H(i)
\end{aligned}
$$

$$
\begin{aligned}
\max \sum_{i=1}^{n_d} \sum_{j \in H(i)} x_{ij} & \\
\text{s.t.} \sum_{j \in H(i)} x_{ij} \le 1, & \qquad i \in \{1, \dots, n_d\}, \\
\sum_{i \in D(j)} x_{ij} \le c_j, & \qquad j \in \{1, \dots, n_h\}, \\
c_j \left(1 - \sum_{q \in H_j^{\le}(i)} x_{iq} \right) \le \sum_{p \in D_i^{\le}(j)} x_{pj}, & \qquad i \in \{1, \dots, n_d\}, j \in H(i), \\
x_{ij} \in \{0, 1\} & \qquad i \in \{1, \dots, n_d\}, j \in H(i)
\end{aligned}
$$

1. n_d is the number of doctors, n_h is the number of hospitals.

$$
\begin{aligned}
\max \sum_{i=1}^{n_d} \sum_{j \in H(i)} & x_{ij} \\
\text{s.t.} \sum_{j \in H(i)} & x_{ij} \leq 1, && i \in \{1, \dots, n_d\}, \\
\sum_{i \in D(j)} & x_{ij} \leq c_j, && j \in \{1, \dots, n_h\}, \\
c_j \left(1 - \sum_{q \in H_j^{\leq}(i)} x_{iq} \right) & \leq \sum_{p \in D_i^{\leq}(j)} x_{pj}, && i \in \{1, \dots, n_d\}, j \in H(i), \\
x_{ij} & \in \{0, 1\} && i \in \{1, \dots, n_d\}, j \in H(i)
\end{aligned}
$$

$$
\begin{aligned}
\max \sum_{i=1}^{n_d} \sum_{j \in H(i)} x_{ij} & \\
\text{s.t.} \sum_{j \in H(i)} x_{ij} \leq 1, & \quad i \in \{1, \dots, n_d\}, \\
\sum_{i \in D(j)} x_{ij} \leq c_j, & \quad j \in \{1, \dots, n_h\}, \\
c_j \left(1 - \sum_{q \in H_j^{\leq}(i)} x_{iq} \right) \leq \sum_{p \in D_i^{\leq}(j)} x_{pj}, & \quad i \in \{1, \dots, n_d\}, j \in H(i), \\
x_{ij} \in \{0, 1\} & \quad i \in \{1, \dots, n_d\}, j \in H(i)
\end{aligned}
$$

1. For doctor i, $H(i)$ is the set of hospitals that doctor i has ranked.
2. For hospital j, $D(j)$ is the set of hospitals that doctor i has ranked, and c_j is the capacity of hospital j.

$$
\begin{aligned}
\max \sum_{i=1}^{n_d} \sum_{j \in H(i)} x_{ij} \\
\text{s.t.} \sum_{j \in H(i)} x_{ij} \leq 1, & \qquad i \in \{1, \dots, n_d\}, \\
\sum_{i \in D(j)} x_{ij} \leq c_j, & \qquad j \in \{1, \dots, n_h\}, \\
c_j \left(1 - \sum_{q \in H_j^{\leq}(i)} x_{iq} \right) \leq \sum_{p \in D_i^{\leq}(j)} x_{pj}, & \qquad i \in \{1, \dots, n_d\}, j \in H(i), \\
x_{ij} \in \{0, 1\} & \qquad i \in \{1, \dots, n_d\}, j \in H(i)
\end{aligned}
$$

$$
\begin{aligned}
\max \sum_{i=1}^{n_d} \sum_{j \in H(i)} & x_{ij} && \\
\text{s.t.} \sum_{j \in H(i)} & x_{ij} \leq 1, && i \in \{1, \ldots, n_d\}, \\
\sum_{i \in D(j)} & x_{ij} \leq c_j, && j \in \{1, \ldots, n_h\}, \\
c_j \left(1 - \sum_{q \in H_j^{\leq}(i)} x_{iq} \right) & \leq \sum_{p \in D_i^{\leq}(j)} x_{pj}, && i \in \{1, \ldots, n_d\}, j \in H(i), \\
& x_{ij} \in \{0, 1\} && i \in \{1, \ldots, n_d\}, j \in H(i)
\end{aligned}
$$

1. For doctor i and hospital j, $H_j^{\leq}(i)$ is the set of hospitals that doctor i thinks are at least as good as hospital j, and $D_i^{\leq}(j)$ is the set of hospitals that hospital j thinks are at least as good as doctor i.

$$
\begin{aligned}
\max \sum_{i=1}^{n_d} \sum_{j \in H(i)} x_{ij} & \\
\text{s.t.} \sum_{j \in H(i)} x_{ij} \leq 1, & \qquad i \in \{1, \dots, n_d\}, \\
\sum_{i \in D(j)} x_{ij} \leq c_j, & \qquad j \in \{1, \dots, n_h\}, \\
c_j \left(1 - \sum_{q \in H_j^{\leq}(i)} x_{iq} \right) \leq \sum_{p \in D_i^{\leq}(j)} x_{pj}, & \qquad i \in \{1, \dots, n_d\}, j \in H(i), \\
x_{ij} \in \{0, 1\} & \qquad i \in \{1, \dots, n_d\}, j \in H(i)
\end{aligned}
$$

$$
\begin{aligned}
\max \sum_{i=1}^{n_d} \sum_{j \in H(i)} & x_{ij} \\
\text{s.t.} \sum_{j \in H(i)} & x_{ij} \le 1, && i \in \{1, \dots, n_d\}, \\
\sum_{i \in D(j)} & x_{ij} \le c_j, && j \in \{1, \dots, n_h\}, \\
& c_j \left(1 - \sum_{q \in H_j^{\leq}(i)} x_{iq} \right) \le \sum_{p \in D_i^{\leq}(j)} x_{pj}, && i \in \{1, \dots, n_d\}, j \in H(i), \\
& x_{ij} \in \{0, 1\} && i \in \{1, \dots, n_d\}, j \in H(i)
\end{aligned}
$$

1. If every hospital ranks every doctor, and vice-versa, we will have $n_d \times n_h$ constraints for stability.

Assessing, and improving, ILP models

We now talk about ways of assessing and improving ILP models. Improving is specifically aimed at “finding a solution faster” — the model shown already finds an optimal solution, there cannot be a “more optimal” solution.

Recall that, if every hospital ranks every doctor, and vice-versa, we will have $n_d \times n_h$ constraints for stability.

$$d_a : h_w[h_x h_y]h_z$$

1. Let w^d_{ir} be 1 if and only if doctor i is assigned to a hospital of rank at most r.
2. Let w^h_{jr} be 1 if and only if hospital j is assigned to a doctor of rank at most r.

Then we can model stability as

$$c_j \left(1 - w^d_{i,r^d_j(i)}\right) \leq w^h_{j,r^h_i(j)}.$$

Now if every doctor has R_d ranks and each hospital has R_h ranks, we have $R_d \times R_h$ stability constraints. If the doctors and hospitals have many ties, and thus few ranks, then this will mean fewer stability constraints. This can result in faster solve times.

$$d_a : h_w[h_x h_y]h_z$$

1. Let w^d_{ir} be 1 if and only if doctor i is assigned to a hospital of rank at most r.
2. Let w^h_{jr} be 1 if and only if hospital j is assigned to a doctor of rank at most r.

Then we can model stability as

$$c_j \left(1 - w^d_{i,r^d_j(i)}\right) \leq w^h_{j,r^h_i(j)}.$$

Now if every doctor has R_d ranks and each hospital has R_h ranks, we have $R_d \times R_h$ stability constraints. If the doctors and hospitals have many ties, and thus few ranks, then this will mean fewer stability constraints. This can result in faster solve times.

1. h_w is the rank-1 choice of d_a, h_x and h_y are both rank-2 choices of d_a, and h_z is the rank-3 choice of d_1.

The real world is hard

Some resident doctors are in relationships such that two different resident doctors are considered a couple.

The couple cannot be assigned to two arbitrary hospitals, instead the couple (d_1, d_2) submits a list of preference pairs $(h1, h1), (h1, h2), (h1, \emptyset)$, where this last entry $(h_1, \emptyset)$ means d_1 is assigned to h_1 and d_2 is unassigned.

With couples, it is possible that there will be no stable matchings at all.

Stability is based on blocking pairs, but do hospitals know about couples?

$$h_1(2) : \underline{d_1}, d_2, \underline{d_3}$$

Would h_1, d_2 be a blocking pair?

Stability is based on blocking pairs, but do hospitals know about couples?

$$h_1(2) : \underline{d_1}, d_2, \underline{d_3}$$

Would h_1, d_2 be a blocking pair?

1. There are no actual answers here. Different definitions have been suggested in literature, and different allocation schemes use different definitions.

Stability is based on blocking pairs, but do hospitals know about couples?

$$h_1(2) : \underline{d_1}, d_2, \underline{d_3}$$

Would h_1, d_2 be a blocking pair? What if (d_1, d_3) are a couple?

Stability is based on blocking pairs, but do hospitals know about couples?

$$h_1(2) : \underline{d_1}, d_2, \underline{d_3}$$

Would h_1, d_2 be a blocking pair? What if (d_1, d_3) are a couple?

1. There are no actual answers here. Different definitions have been suggested in literature, and different allocation schemes use different definitions.

Stability is based on blocking pairs, but do hospitals know about couples?

$$h_1(2) : \underline{d_1}, d_2, \underline{d_3}$$

Would h_1, d_2 be a blocking pair? What if (d_1, d_3) are a couple?

$$h_1(2) : d_1, \underline{d_2}, d_3$$

Would h_1, d_1 be a blocking pair?

Stability is based on blocking pairs, but do hospitals know about couples?

$$h_1(2) : \underline{d_1}, d_2, \underline{d_3}$$

Would h_1, d_2 be a blocking pair? What if (d_1, d_3) are a couple?

$$h_1(2) : d_1, \underline{d_2}, d_3$$

Would h_1, d_1 be a blocking pair?

1. There are no actual answers here. Different definitions have been suggested in literature, and different allocation schemes use different definitions.

Stability is based on blocking pairs, but do hospitals know about couples?

$$h_1(2) : \underline{d_1}, d_2, \underline{d_3}$$

Would h_1, d_2 be a blocking pair? What if (d_1, d_3) are a couple?

$$h_1(2) : d_1, \underline{d_2}, d_3$$

Would h_1, d_1 be a blocking pair? What if (d_1, d_3) are a couple?

Stability is based on blocking pairs, but do hospitals know about couples?

$$h_1(2) : \underline{d_1}, d_2, \underline{d_3}$$

Would h_1, d_2 be a blocking pair? What if (d_1, d_3) are a couple?

$$h_1(2) : d_1, \underline{d_2}, d_3$$

Would h_1, d_1 be a blocking pair? What if (d_1, d_3) are a couple?

1. There are no actual answers here. Different definitions have been suggested in literature, and different allocation schemes use different definitions.

$$h_1(2) : d_1, \underline{d_2}, \underline{d_3}, d_4$$

Now (d_1, d_4) are a couple and (d_2, d_3) are a couple. Are there any blocking pairs? What if (d_1, d_4) are assigned instead of (d_2, d_3)?

$$h_1(2) : d_1, \underline{d_2}, \underline{d_3}, d_4$$

Now (d_1, d_4) are a couple and (d_2, d_3) are a couple. Are there any blocking pairs? What if (d_1, d_4) are assigned instead of (d_2, d_3)?

1. There are no actual answers here. Different definitions have been suggested in literature, and different allocation schemes use different definitions.

- What if there are different capacities for domestic and international resident doctors?

- What if there are different capacities for domestic and international resident doctors?
- What if a hospital must be closed if there are less than k assigned resident doctors?

- What if there are different capacities for domestic and international resident doctors?
- What if a hospital must be closed if there are less than k assigned resident doctors?
- What if we consider a pair to be blocking if the doctor gets a better placement, and the hospital does not get a worse doctor?

- Resident doctors do need to be allocated to hospital courses for further training
- The doctors and hospital courses each have preferences over each other
- This problem is “easy” if we assume a simplified model
- The problem becomes hard if we allow the complexities of the real world to get involved