Acknowledgments

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Medical Residencies

- After graduating from medical school, doctors in the U.S. and other countries need to work as hospital residents before they can be authorized to practice.

- In the US about 40’335 U.S., Canadian, and foreign medical school seniors and graduates look for residencies. This total includes 17’487 U.S. allopathic medical school seniors, and 7,568 non-U.S. citizens and graduates of international medical schools.

- Around 4’000 participating 'teaching' hospitals try to fill around 29’171 positions (including 26’392 first-year (PGY-1) positions).

- 28,130 positions filled in the match, and 878 filled in an after match scramble.

- Match rate: for U.S. allopathic seniors: 93.7% for international applicants: 47.6%.
Summary Statistics

**Figure 1** Applicants and 1st Year Positions in The Match, 1952 - 2013

Source: NRMP. Results and Data. 2013 Main Residency Match
Figure 4: PGY-1 Match Rates by Applicant Type, 1982 - 2013

Summary Statistics

Percent Matched

- U.S. Seniors
- Others
- U.S. IMGs
- Non-U.S. IMGs

Source: NRMP. Results and Data. 2013 Main Residency Match
Summary Statistics

Number of Positions Offered and Filled for Selected Specialties, 2013

Source: NRMP. Results and Data. 2013 Main Residency Match
Summary Statistics

Chart 3: Match Rates
Percent Matched by Preferred Specialty and Applicant Type

**How Does the Market Operates?**

- Market operates via a central clearinghouse called National Residency Matching Program (www.nrmp.org):
- Students apply to hospitals in early fall. Hospitals invite some back for interviews that take place from November till February.
- There are rules about what can and cannot be asked at the interviews. In particular, positions cannot be offered at the interviews.
- In February, students and hospitals state their preferences:
  - Each students submits a rank-order list of hospitals she interviewed with (e.g. UCLA Ronald Reagan > Cedars-Sinai Medical Center > ...).
  - Each hospital does the same for students (and also reveals how many spots it has).
- The company called National Matching Services Inc. (http://www.natmatch.com) takes these preferences and generates a matching (which student goes to which hospital).

Why run a market this way?
History of Residency Matching

- Medical students used to found residencies through a decentralized process.
- There were problems: in early XX century there were more residencies than students and the competition among hospitals led to them to making offers to students earlier and earlier.
- This ”unravelling” problem was resolved in 1946 by an agreement among medical schools that they will not release students’ records prior to the end of the junior year.
- Another problem transpired however: a student would hold onto an offer while hoping to receive a better offer.
  - If the student finally rejected, other students the hospital wanted to make offers to might have already accepted offers elsewhere.
  - If the student finally accepted, he could then get a better offer, and sometimes default on the initial acceptance.

Roth 1984 provides a detailed account of this history, and is the main reference for the economic study of medical residencies
kuznets.fas.harvard.edu/~aroth/papers/evolut.pdf
In 1952 the hospitals agreed to adopt a centralized clearinghouse initially called National Intern Matching Program (NIMP) and later renamed Residency Matching Program).

This system is still in use (after a modification in late 1990s to handle couples)

In the early 1980s, Al Roth noticed that the NRMP was using an algorithm proposed by David Gale and Lloyd Shapley (from UCLA) in 1962. Properties they discovered may help explain NRMP success.
How Do We Go from Rank Order Lists to a Matching?

A classroom experiment
Plan for the next week

We’re going to look at a theory of two-sided matchings:

- Two types of agents, each with preferences over agents of the other type. They need to be matched.
- We are going to first look for ‘stable’ outcomes or matchings.
- Do we always have stable matchings? Can we find them?
- We will then look at agents’ incentives in reporting their preferences to the algorithm

Equipped with this theory, we will return to a discussion of NRMP