

***The Economics of Follow-on Drug R&D:  
Trends in Entry Rates and the Timing of  
Development***

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# *Common Criticisms of “Me-Too” Drug Development*

**“The drug companies do almost no innovation now. It’s just turning out one more drug that’s similar to a blockbuster. These are called copycat drugs, or “me-too” drugs. That’s their major business now.”**

**“It is true that only a handful of drugs that start out in testing make it through to FDA approval. That’s one reason that the drug companies are turning their efforts to “me-too” drugs, where you just have to twiddle a molecule a little bit to make essentially the same drug, or make the same drug for a different use.”**

*Source: PBS Frontline, “The Other Drug War”, June 19, 2003: interview with Marcia Angell, M.D.  
[wysiwyg://69/http://www.pbs.org/wgbh/pa...line/shows/other/interviews/angell.htm](http://www.pbs.org/wgbh/pa...line/shows/other/interviews/angell.htm)*

## *How Recent Are the Criticisms?*

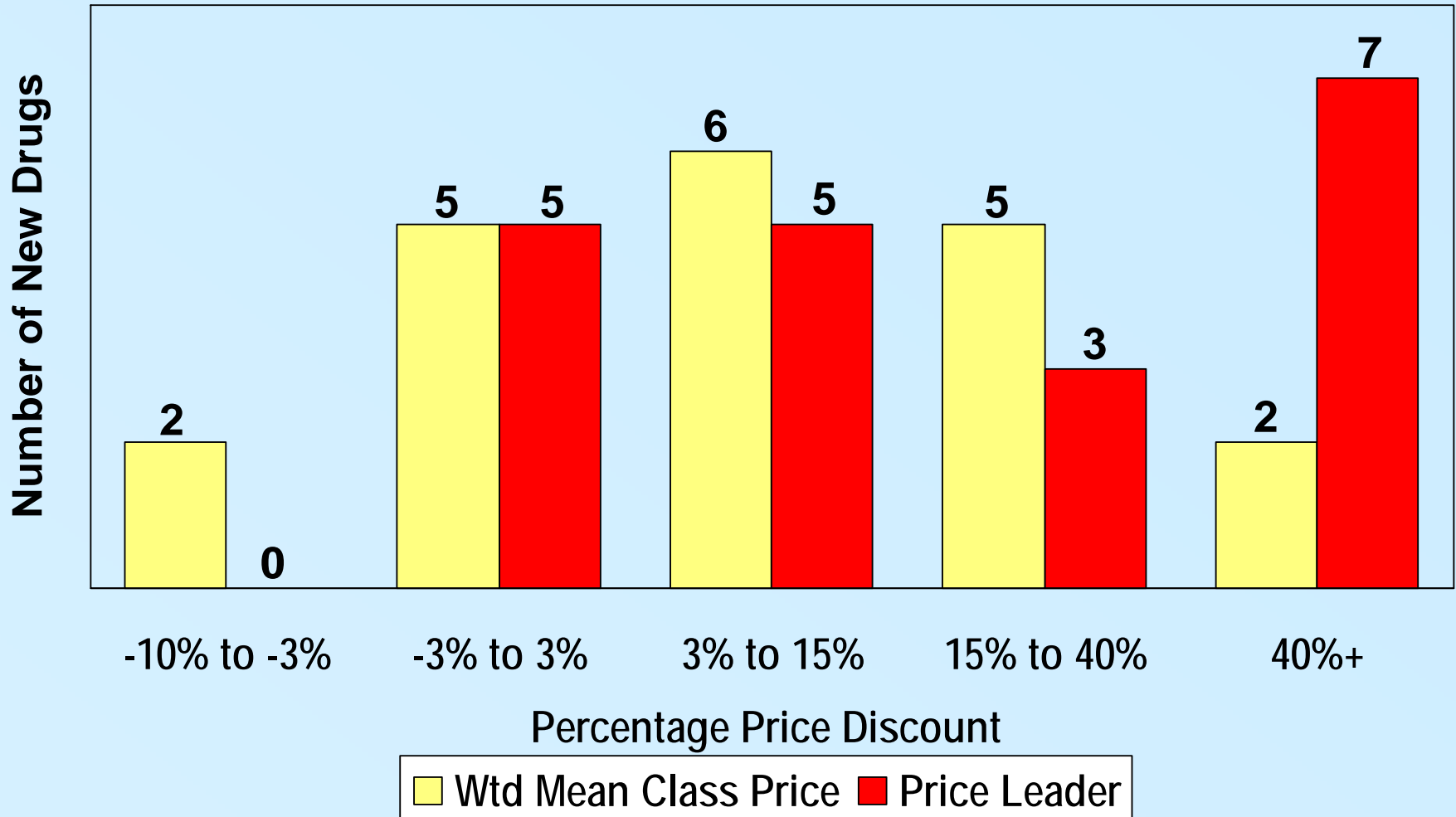
**“Although forced to admit that industry expenditures for research and development were large in comparison to other industries, the committee argued that little of social value resulted from industry laboratories (U.S. Senate Report *1961*, pp.115-41)...commercial laboratories were concerned largely with “molecule manipulations,” or new drugs therapeutically similar to those already on the market. The implication was that industry research was highly duplicative and that much of it could be eliminated without reducing the flow of important new drugs.”**

*Source: Comanor, “The Political Economy of the Pharmaceutical Industry,”  
Journal of Economic Literature 1986 24(3):1189*

# *“Me-Too” Drug Questions to Consider*

- ◆ Duplicative, wasteful, simple-minded post-hoc research or a research-intensive multifirm search for clinical improvements?
- ◆ Perfect substitutes or product differentiation from diverse product profiles and varying individual responses?
- ◆ What trends exist in periods of exclusivity?
- ◆ Is the first-in-class the best-in-class?
- ◆ What trends exist in the relative timing of development?
- ◆ What is the impact on pricing?

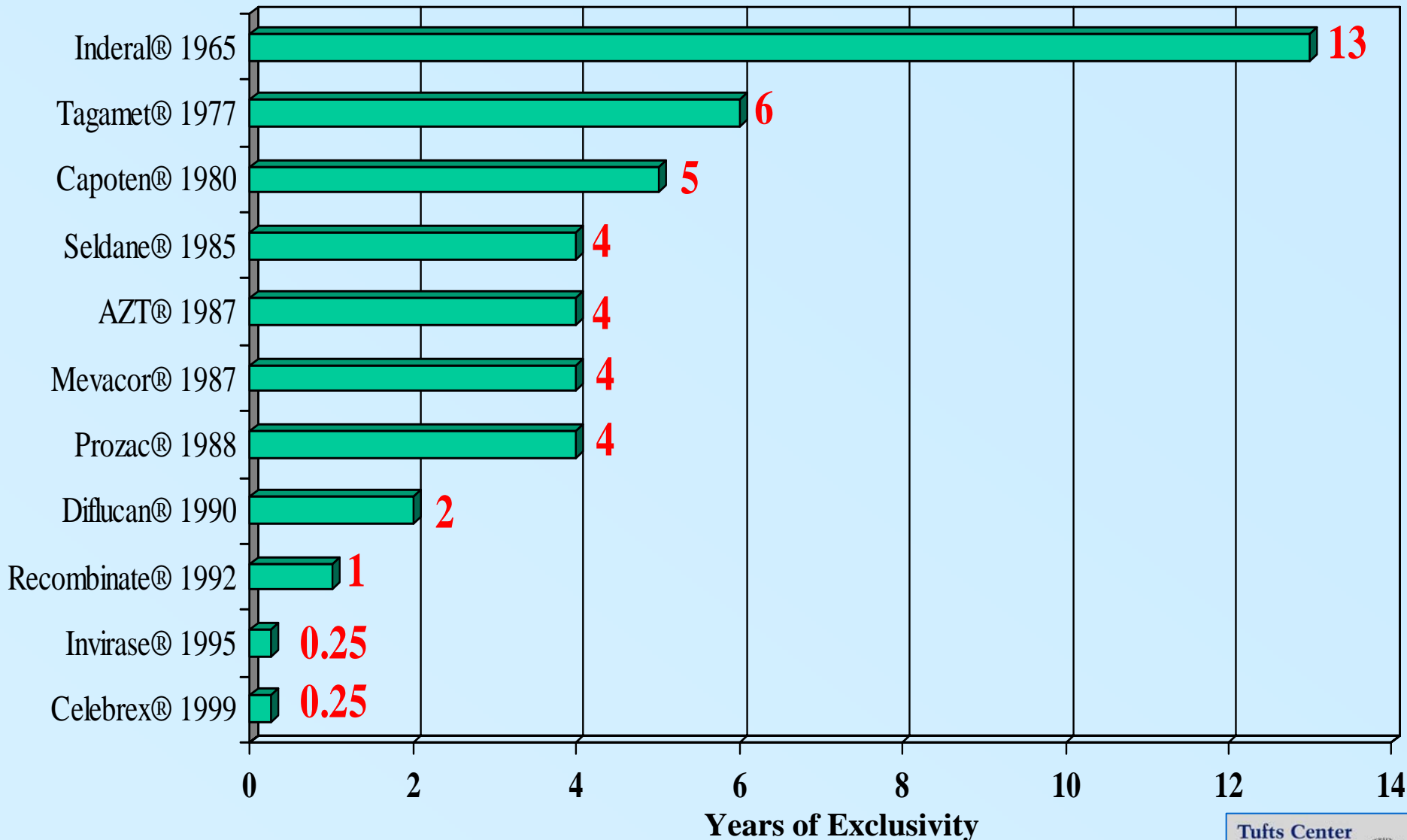
# Do New Drugs Entering an Existing Class Induce Price Competition?



*Fiscal years 1995-1999 (Oct-Sep)*

*Source: DiMasi 2000 <http://aspe.hhs.gov/health/reports/Drug-papers/dimassi/dimasi-final.htm>*

# Shrinking Period of Market Exclusivity



Source: *Pharmaceutical Research and Manufacturers of America, 2000; The Wilkerson Group, 1995.*

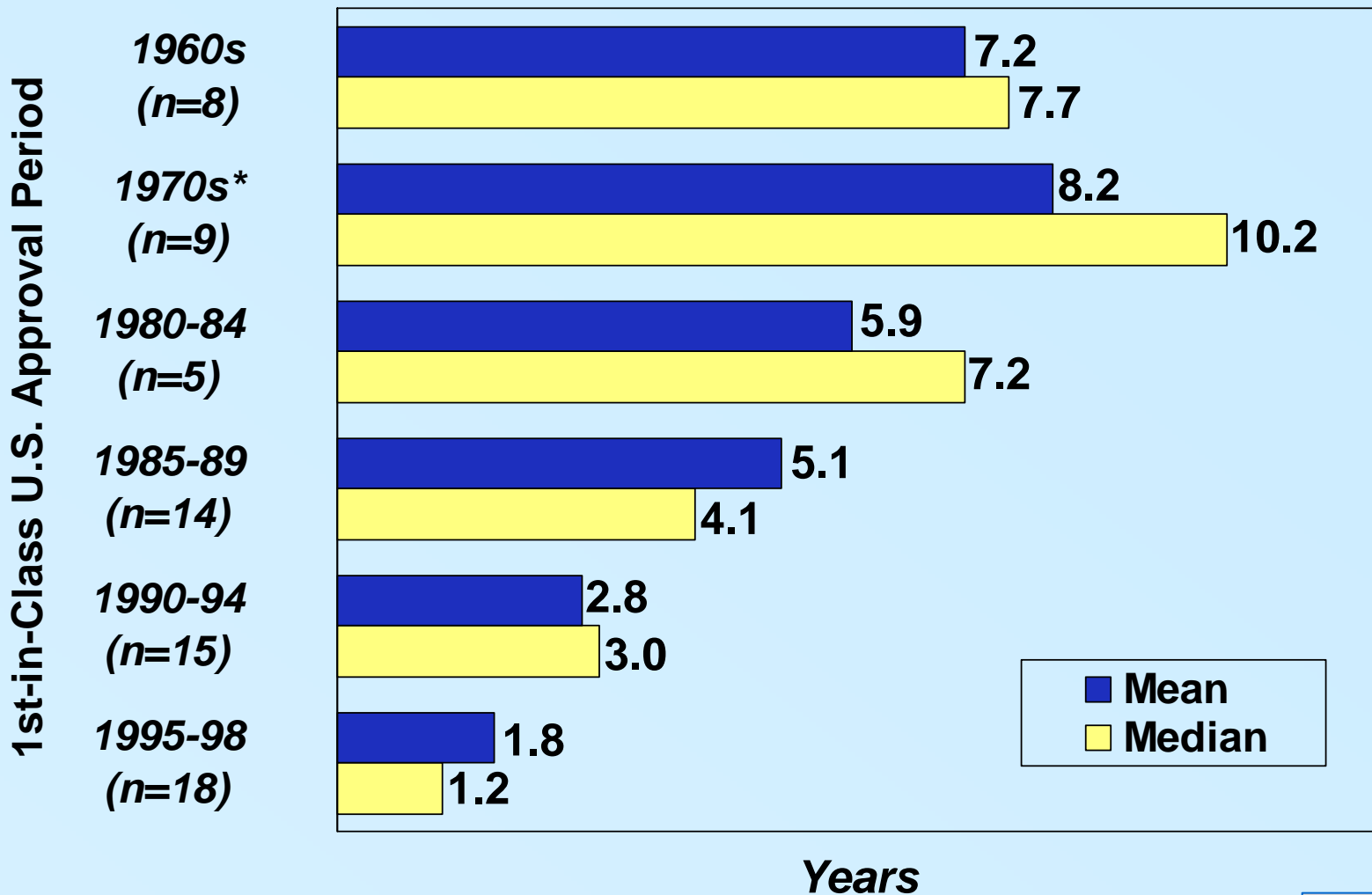
# *Data and Methods (1)*

- ◆ **Examine drug approvals in the U.S. since 1960 to identify therapeutic subclasses**
- ◆ **Subclasses consist of approved compounds that are chemically similar or have the same mechanism of action and are used for the same major indications**
- ◆ **Excludes drugs with unknown mechanism of action**
- ◆ **Tufts CSDD data on development milestones for follow-on drugs examined in relation to approval of “breakthrough” drug**

## *Data and Methods (2)*

- ◆ **72 subclasses identified with the first-in-class drug approved from 1960 to 1998**
- ◆ **Follow-on drug approvals for the subclasses identified through 2003**
- ◆ **235 follow-on drugs identified for the 72 first-in-class drugs**
- ◆ **The number of drugs per subclass ranged from 2 to 16, with a mean of 4.3 and a median of 3**

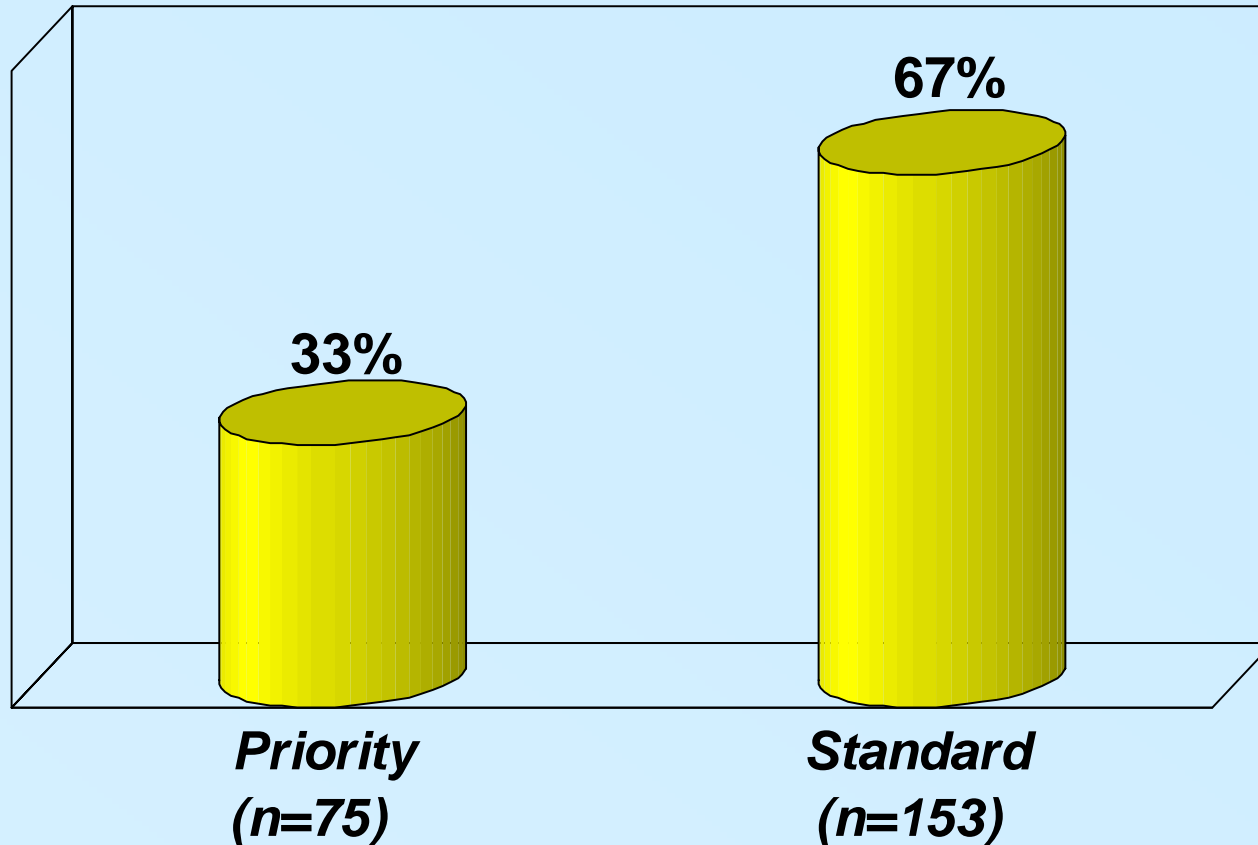
# Marketing Exclusivity for Subclasses: Time to First Follow-On



\* Two extreme outlier classes were excluded (SERMs and rifamycin antibiotics)

Source: DiMasi and Paquette, *Pharmacoeconomics* 2004;22(Suppl 2):1-14.

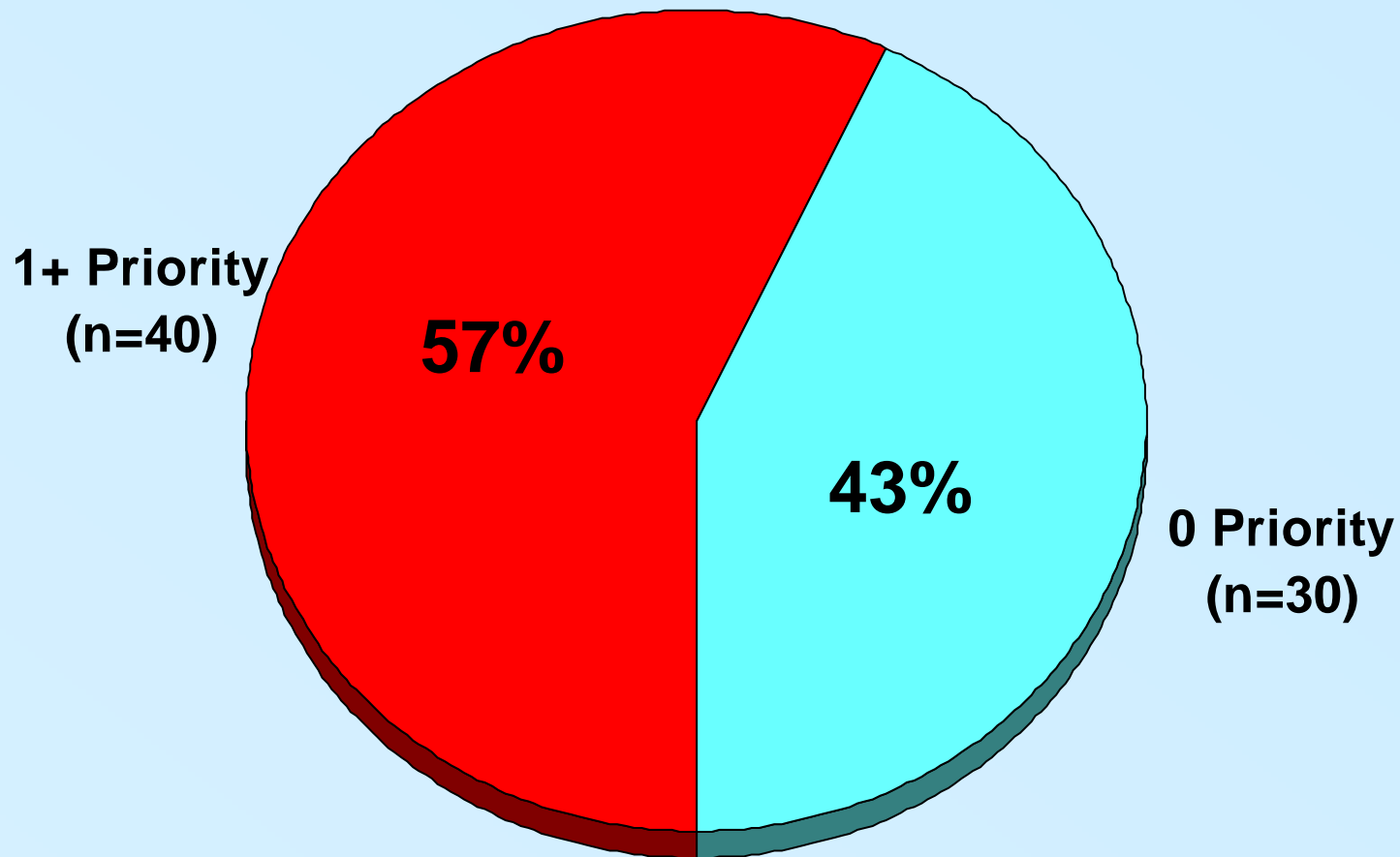
# FDA Therapeutic Ratings for Follow-on Drugs\*



\* Ratings were not available for seven compounds

Source: DiMasi and Paquette, *Pharmacoeconomics* 2004;22(Suppl 2):1-14.

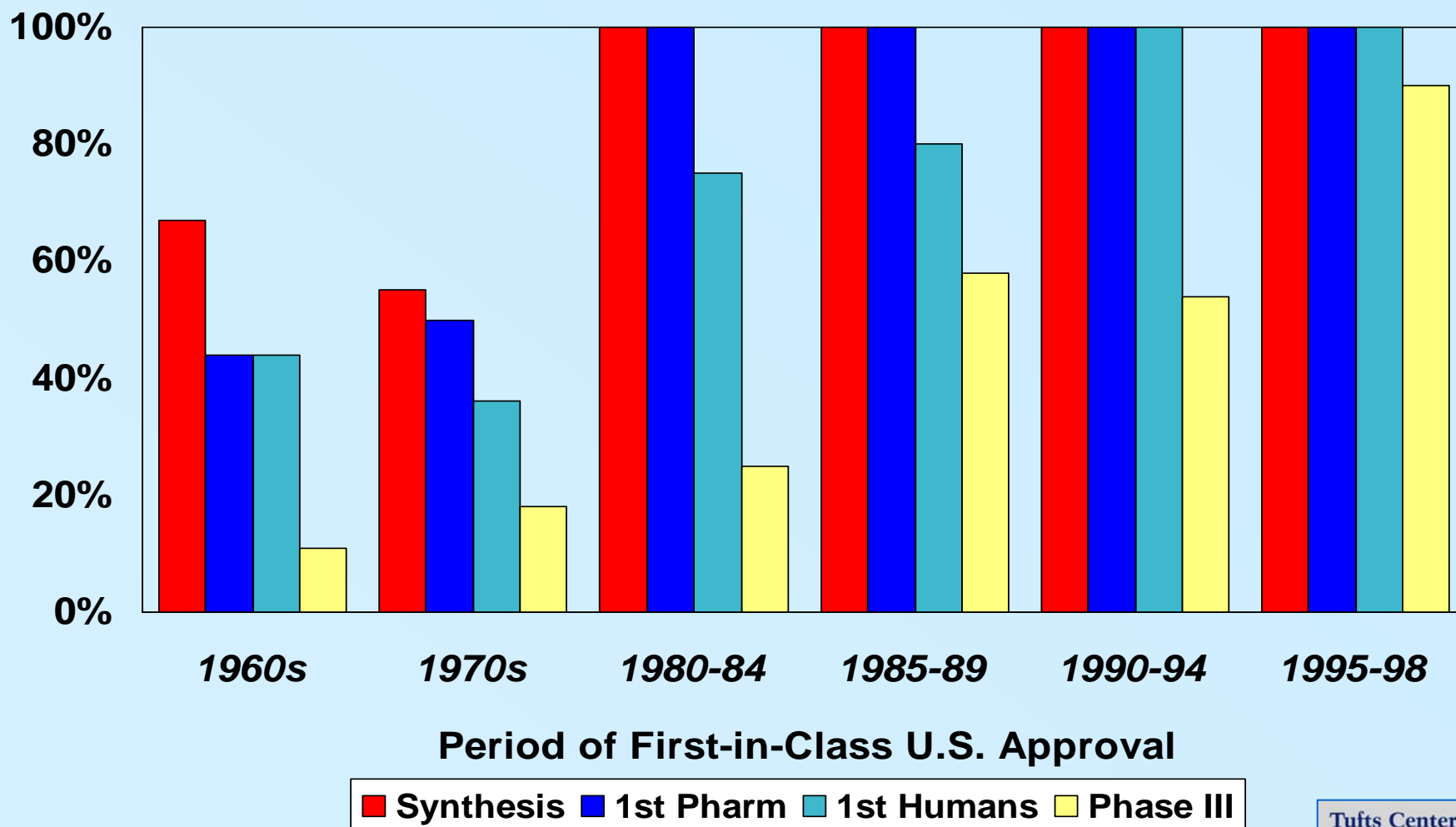
# Subclasses With at Least One Follow-on With a Priority Rating\*



•Ratings for first-in-class and all follow-ons were not available for two subclasses

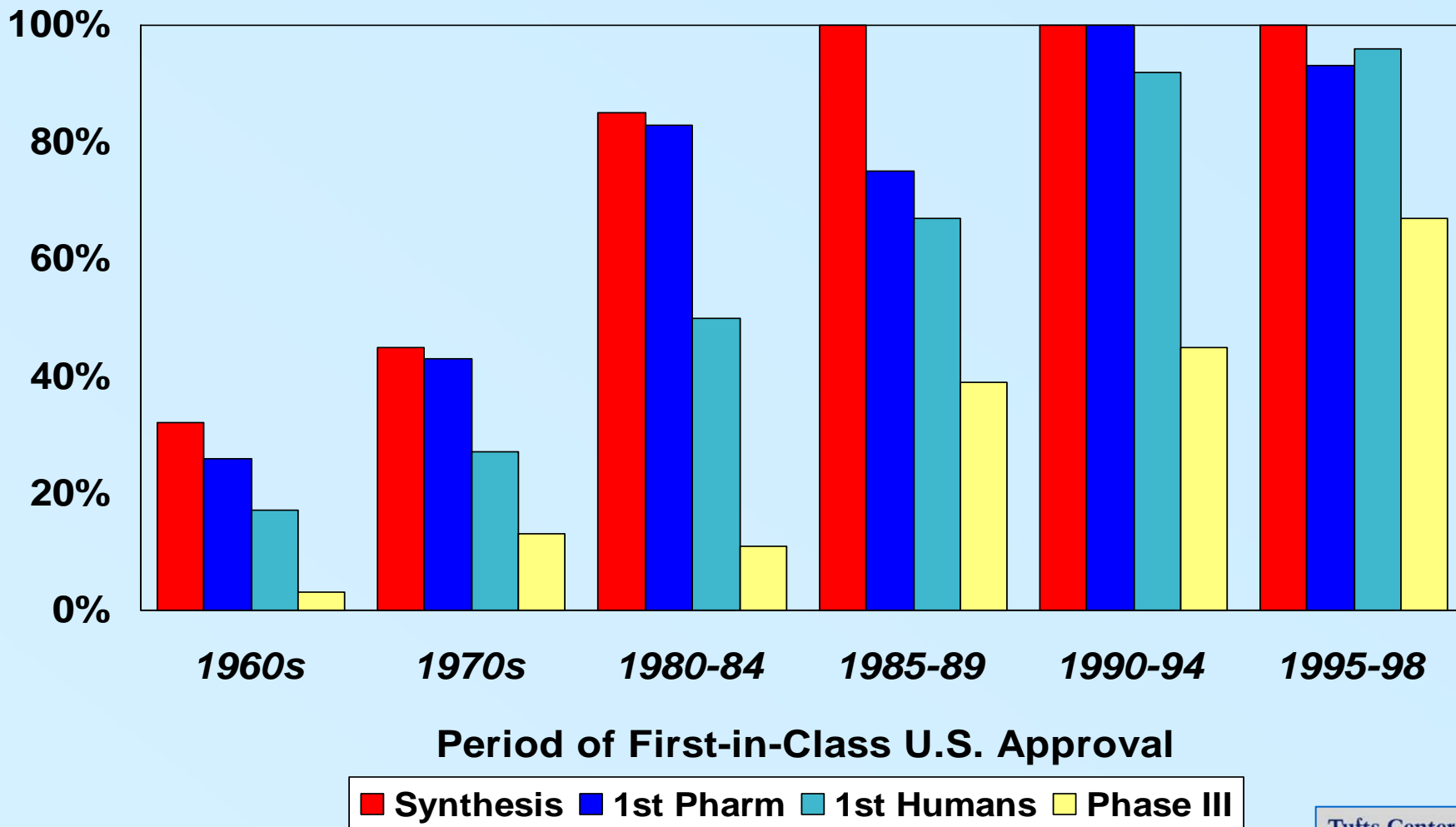
Source: DiMasi and Paquette, *Pharmacoeconomics* 2004;22(Suppl 2):1-14.

# Percent of Subclasses With At Least One Follow-on Drug With Milestone Prior to First-in-Class Approval



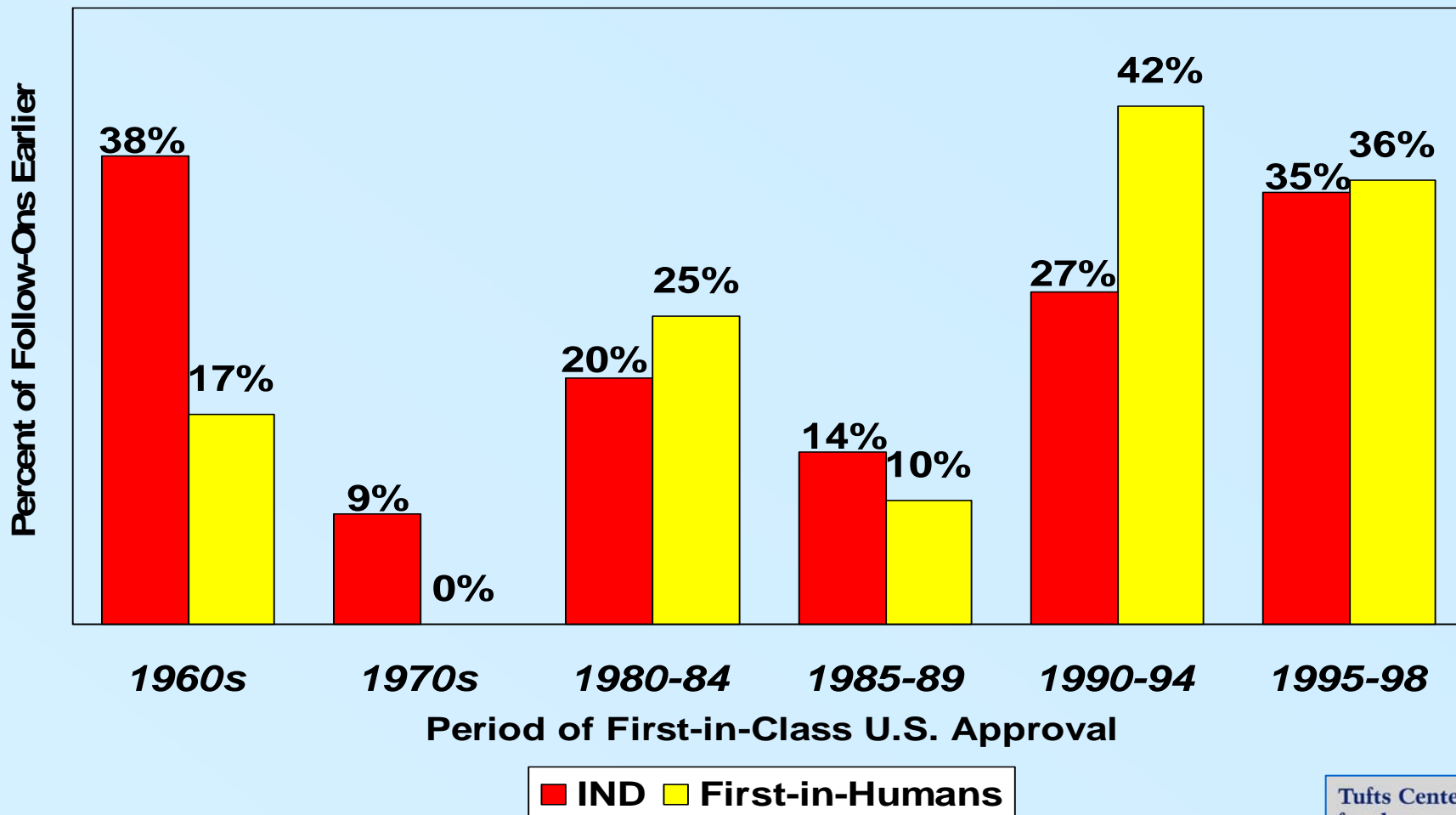
Source: DiMasi and Paquette, *Pharmacoeconomics* 2004;22(Suppl 2):1-14.

# Percent of Follow-on Drugs Having Reached Milestone Prior to First-in-Class Approval



Source: DiMasi and Paquette, *Pharmacoeconomics* 2004;22(Suppl 2):1-14.

# Percent of Follow-on Drugs Reaching Clinical Milestone Prior to First-in-Class Reaching Same Milestone



Source: DiMasi and Paquette, *Pharmacoeconomics* 2004;22(Suppl 2):1-14.

# *Policy Proposals to Deal With the Me-Too “Problem”*

- ◆ **Restrictive reimbursement for follow-ons**
- ◆ **Price premia for innovative drugs**
- ◆ **Registration hurdles**

# *Problems With Registration “Solutions”*

- ◆ It is more likely that targeted R&D will be successful if a number of firms are independently pursuing the same leads
- ◆ Artificial distinction between “breakthrough” and “me-too” R&D (most follow-on development occurs prior to approval of the first-in-class drug)
- ◆ Increases substantially the cost of development
- ◆ Probably more importantly it greatly increases uncertainty (have to radically shift development plans in mid-stream as new approvals occur)
- ◆ The outcome may be that too little or no development in some subclasses is undertaken
- ◆ R&D spillovers into other development areas may then also be lost (Henderson and Cockburn, 1995)

# *Summary*

- ◆ **Follow-on drugs can provide clinical benefits by facilitating individualized therapy or offering improved safety/efficacy/convenience profiles (Werthheimer et al., 2001)**
- ◆ **There is evidence that, on average, prices are reduced when follow-on drugs are introduced**
- ◆ **Periods of marketing exclusivity have been shrinking for breakthrough drugs**
- ◆ **Most development is simultaneous, so it is hard to meaningfully distinguish breakthrough from follow-on R&D**