FDA impact on US medical technology innovation

(A survey of over 200 medtech companies)

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Disclosures

- This study was made possible through the financial, intellectual and logistical support of various industry organizations including MDMA, NVCA, ExploraMed, state medical industry organizations, and hundreds of participating medical device companies.
- All companies participating in the survey were assured of confidentiality and thus the data collected will only be presented in an aggregated format so that company-specific information would not be disclosed.
- Josh Makower is a Consulting Professor at Stanford, a Venture Partner at NEA, CEO of ExploraMed (a medical device incubator) and on the board as well as a consultant to several medical device companies.
- Aabed Meer, who conducted all the phone interviews, is a student at Stanford, and received a stipend to perform the survey but has no other potential sources of conflict.
- PricewaterhouseCoopers, LLP has independently verified the data set and analysis.

Medtech and healthcare innovation is important for patients and our economy

- Health improvements from 1980 to 2000…
  - 4% ↑ in life expectancy
  - 16% ↓ in annual mortality rates
  - 25% ↓ in elderly disability rates

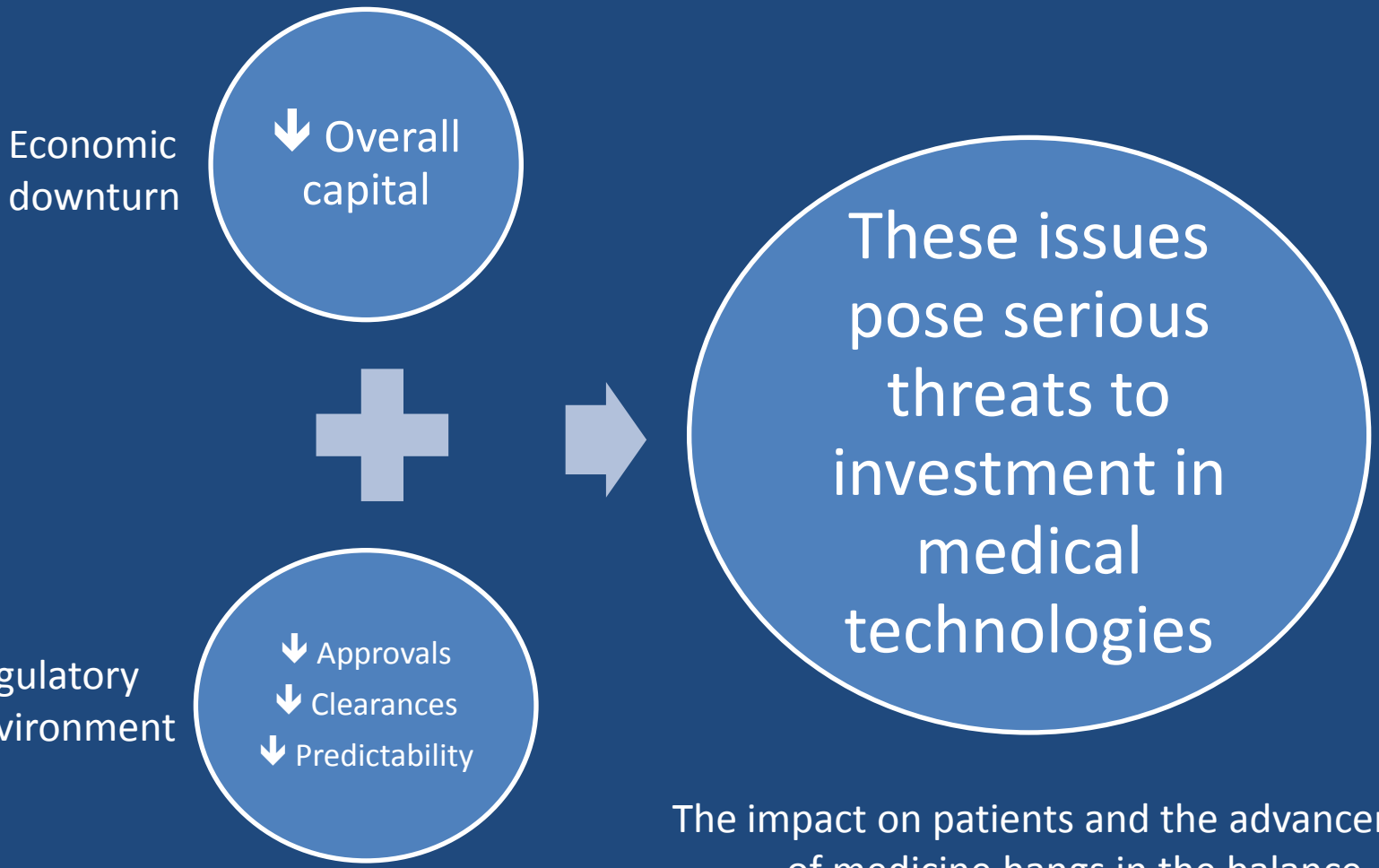
    The Value of Investment in Healthcare, MEDTAP International, 2004.

- >357,000 direct jobs and >1,600,000 indirect jobs
  - Scientists and engineers in small entrepreneurial companies help drive the economy

    The Lewin Group, State Economic Impact of the Medical Technology Industry, 2007.

Growing challenges to innovation

After 2008, annual Medtech investment is down $1B*



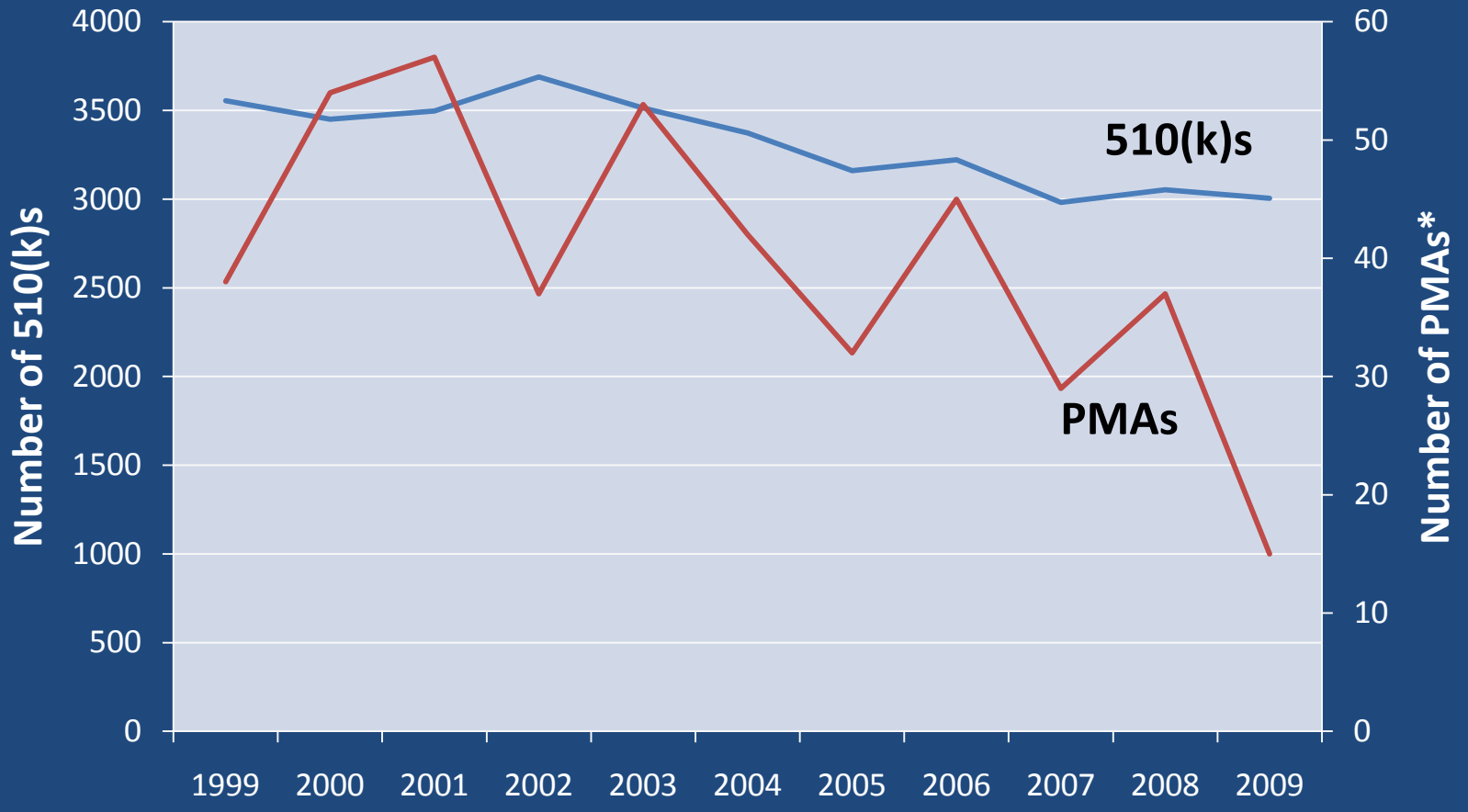
The impact on patients and the advancement of medicine hangs in the balance

*NVCA Data

FDA regulatory pathways

- Two primary pathways
  - PMA for novel, high risk technologies
  - 510(k) for low to medium risk technologies
    - Builds on established clinical & scientific data
    - Allows for rapid iteration and improvement

Declining 510(k) clearances and PMAs over last 10 years



*Original PMAs

FDA PMA data http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPMA/pma.cfm
FDA 510(k) data http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPMN/pmn.cfm

Changes underway at FDA

- Many companies have reported extreme difficulty navigating the FDA recently
  - Many IDEs stalled & PMA process increasingly difficult to navigate
  - Unpredictability, lack of transparency and unreasonableness core issues

- Now 510(k), the main pathway for devices, is under review by FDA and IOM
  - FDA and IOM are seeking industry perspectives during public comment period

- But what is really motivating these changes?
  - Is there real evidence of an overall safety concern?
  - Are these the right changes at FDA, or are there other areas where FDA needs improvement to better protect the public health and advance innovation?

- Recent studies suggest that both pathways have protected patients
  - ~99.6% of 510(k)/PMA devices did not have a Class I recall within last 5 years*

    *Hall, R., Using Recall Data to Assess the 510(k) Process, Public Health Effectiveness of the FDA 510(k) Clearance Process: Workshop #2, Institute of Medicine, Washington, DC, July 2010.

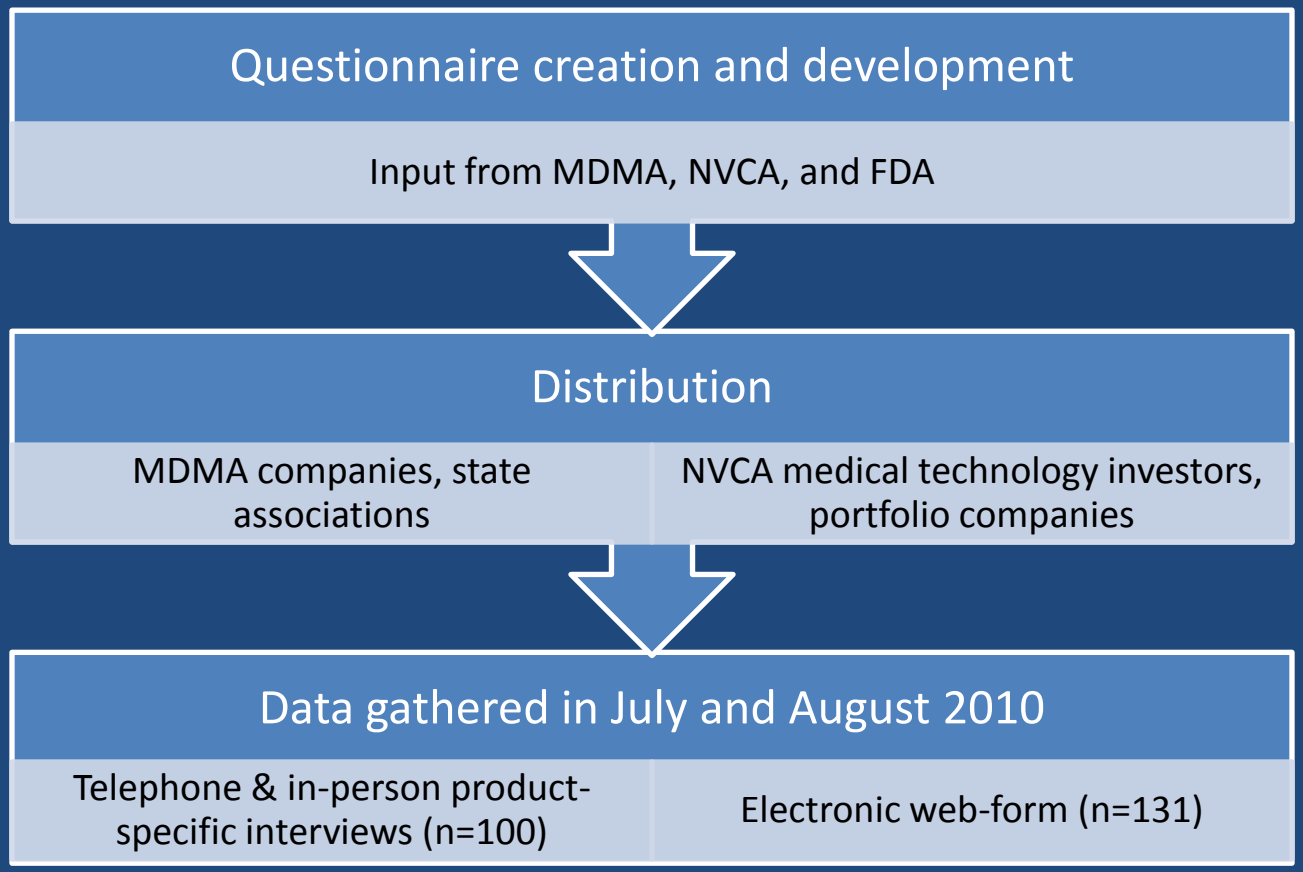
- What is the state of public health and innovation under the FDA today?

FDA Impact On
Medical Device Innovation Survey

Study Objectives

- To determine where problems (if any) are occurring for medtech companies with FDA processes and assess comparisons to the European pathway
- To provide quantitative data regarding the perception of the FDA and European regulatory pathways from medtech companies
- To assess the time and cost to medtech companies navigating the current FDA environment and assess any resultant impact

Study methodology



Overlapping data between the two data sources were screened out resulting in 213 unique product data entries from 204 companies

Industry v. study participant demographics

U.S. Industry	Participants
1023 Public & VC-backed medtech companies	>200 medtech companies
>50% of companies in CA, MN, MA	>50% companies in CA, MN, MA
Orthopedics, Cardiovascular, Non-disease specific	Orthopedics, Cardiovascular, General & Plastic Surgery

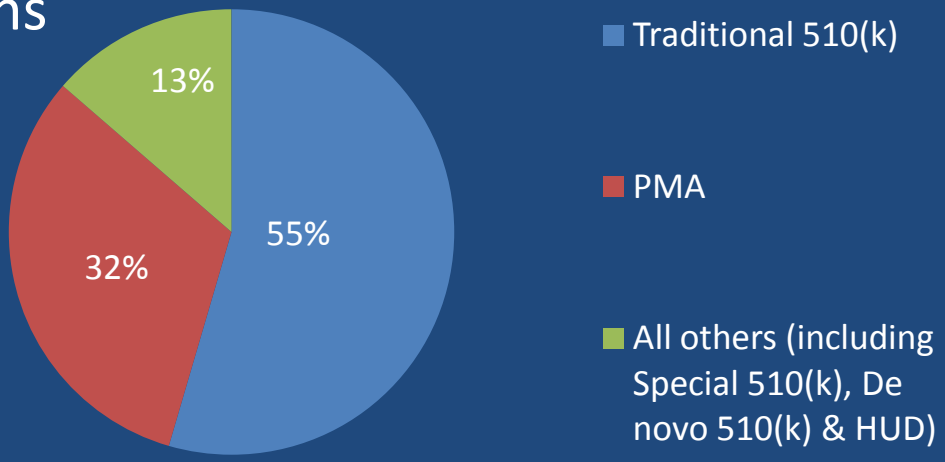
Ernst & Young, Pulse of the Industry, Medical technology report ,2010.

Responder Analysis

- **31% of MDMA members participated**
  - Survey announcement was sent to all 260 MDMA members
  - 95 companies responded, only 80 could be scheduled via phone
- **>17% of companies approached through NVCA participated**
  - Survey announcement was sent to all 211 NVCA members
  - Some members forwarded to their companies; if all medtech portfolio companies had received request, that would be approx. 750 companies
  - 176 companies responded online, but only 131 had trackable data
- Another 20 companies heard about survey (e.g., through state associations) and participated via phone
- Duplicate entries from the MDMA/NVCA surveys were removed leaving 204 companies
- **Total responders = 20% of the target innovator population (204 participants out of a possible 1,020 from the E&Y Survey)**
- The 4776 manufacturers registered on the FDA database is not necessarily the right denominator, because an unknown number are defunct or never produced products, larger companies have multiple registrations per entity, and no detailed information is available.

Study Participant Characteristics

- Regulatory Paths



- 90% Private / 10% Public Companies
- Majority were small companies: Median 33 employees
- Majority were venture-backed companies
- Given these characteristics and reflecting on the response data, the study companies are more likely to be innovators (more likely to be bringing new products to FDA)

Limitations of the study

- Possible sources of selection biases
  - MDMA, NVCA and state association members were only companies formally invited to participate
    - Public & VC-backed medtech companies are more likely to develop novel technologies which may be most impacted by the current FDA environment
  - Participation was voluntary
    - Some refused to participate due to fear of retribution from FDA despite assurances of confidentiality, others too busy or reasons unknown
- The representative 'n' for each question varies across the survey. The reasons for this are as follows:
    - 1. In several cases, some questions were designed to only apply to a smaller subgroup of participants (ex: some only apply to PMA, some only to 510k, some only if an IDE was required, some only if CE mark was sought, etc.)
    - 2. The "interview" survey included a more expansive detailed questionnaire, whereas the "online" survey was smaller and more focused on a subset of those exact questions covered by the interview.
    - 3. In some cases certain fields could not be filled in by the participants due to either lack of available data, incomplete data or no comment – in these cases their responses were excluded from the individual issue analysis, thus each data slide presented is a cohort of willing/able participants and not the complete group.

Landmark study

- Even with limitations, the data from over 200 companies provides a comprehensive compelling look at the state of innovation within the US medical device industry and the ability of US companies to provide the best possible healthcare to US citizens under the current regulatory environment
- First coordinated effort by MDMA, NVCA and a majority of the medtech state associations

Inefficient, inconsistent and unpredictable processes delay patient access

- 44% had review staff/branch chief change
- 34% state appropriate FDA staff/consultants not present at meetings
- >90% state FDA has become much more risk-averse in last decade
- >80% state FDA has difficulty dealing with novel technologies and/or indications
- These issues at FDA have negatively impacted the progress of 66% of companies

510(k) & CE timelines in US & Europe

Reported FDA transit times underestimate actual regulatory delay

FDA (510k)

2 months

is "average reported FDA review time"

3 months

is "average reported total elapsed time from receipt to final decision"

[Office of Device Evaluation, Annual Performance Report, 2009.]

US Companies' Experience With FDA (510k)

10 months

from **first filing** to clearance

31 months

from **first communication** to clearance (n=15) → low because most do not communicate w/ FDA prior to filing)

US Companies' Experience In Europe (CE)

7 months

from **first communication** to certificate

US/CE times reported by survey respondents

PMA & CE timelines in US & Europe

Reported FDA transit times underestimate actual regulatory delay

FDA (PMA)

9 months

is "average reported total elapsed time from filing to approval for all original PMAs"

[Office of Device Evaluation, Annual Performance Report, 2009.]

US Companies Experience With FDA (PMA)

54 months

is time from **first communication** to approval (or till present)

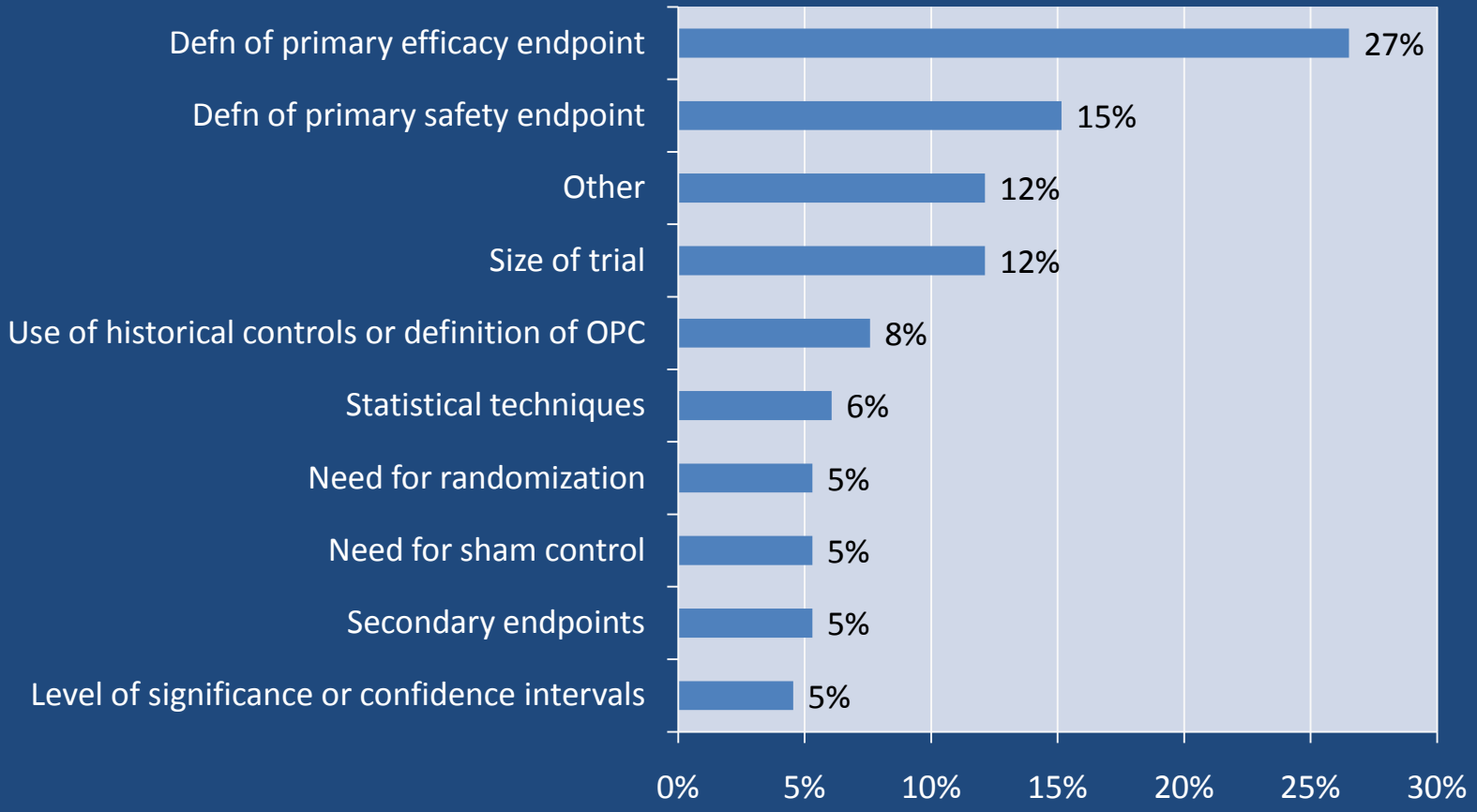
US Companies Experience In Europe (CE)

11 months

is time from **first communication** to certificate

US/CE times reported by survey respondents

Nearly 30% had delays due to disagreements with FDA in the following areas before or after a clinical trial was conducted

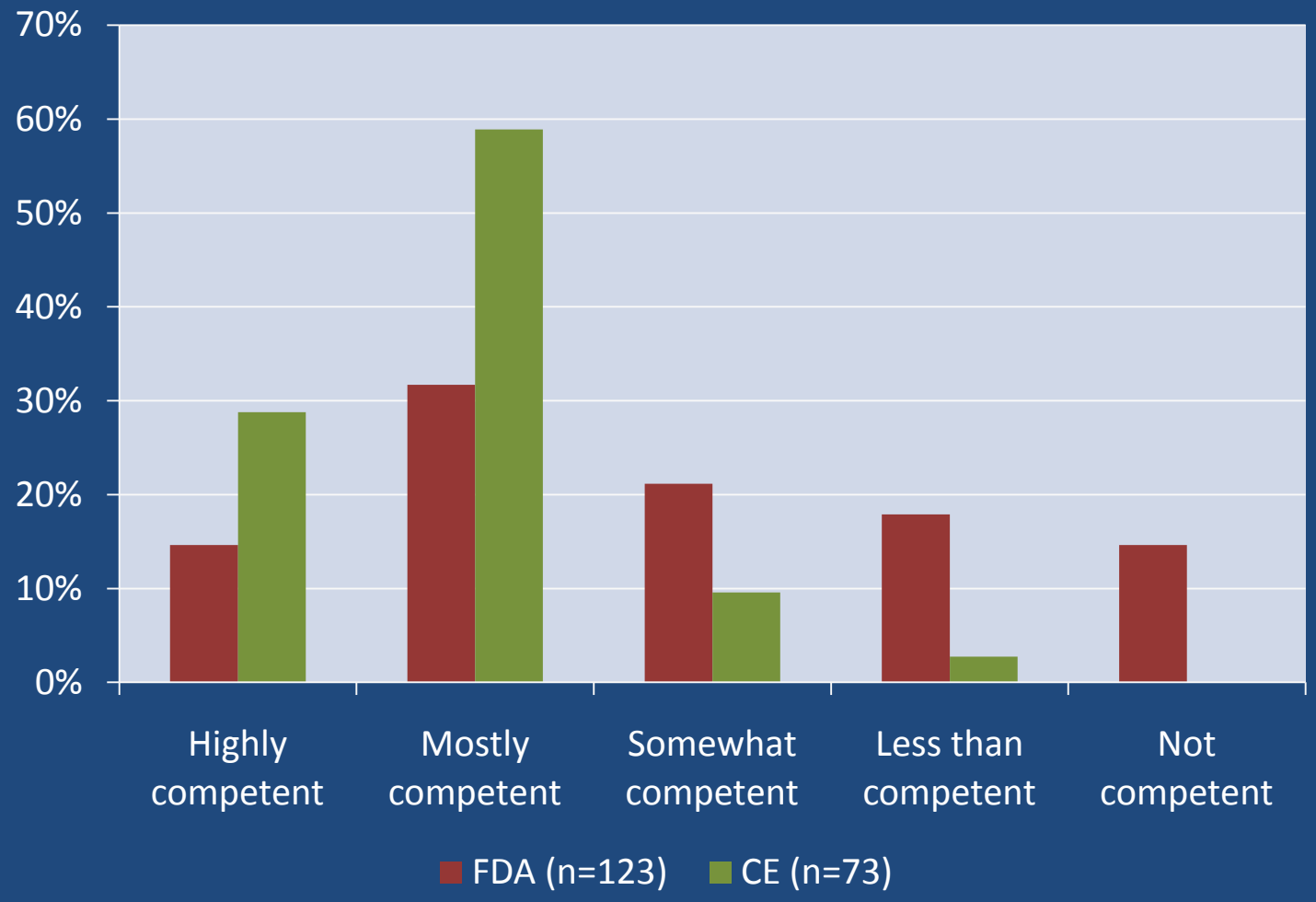


Note: Percentages add up to >100% because respondents could choose more than one answer

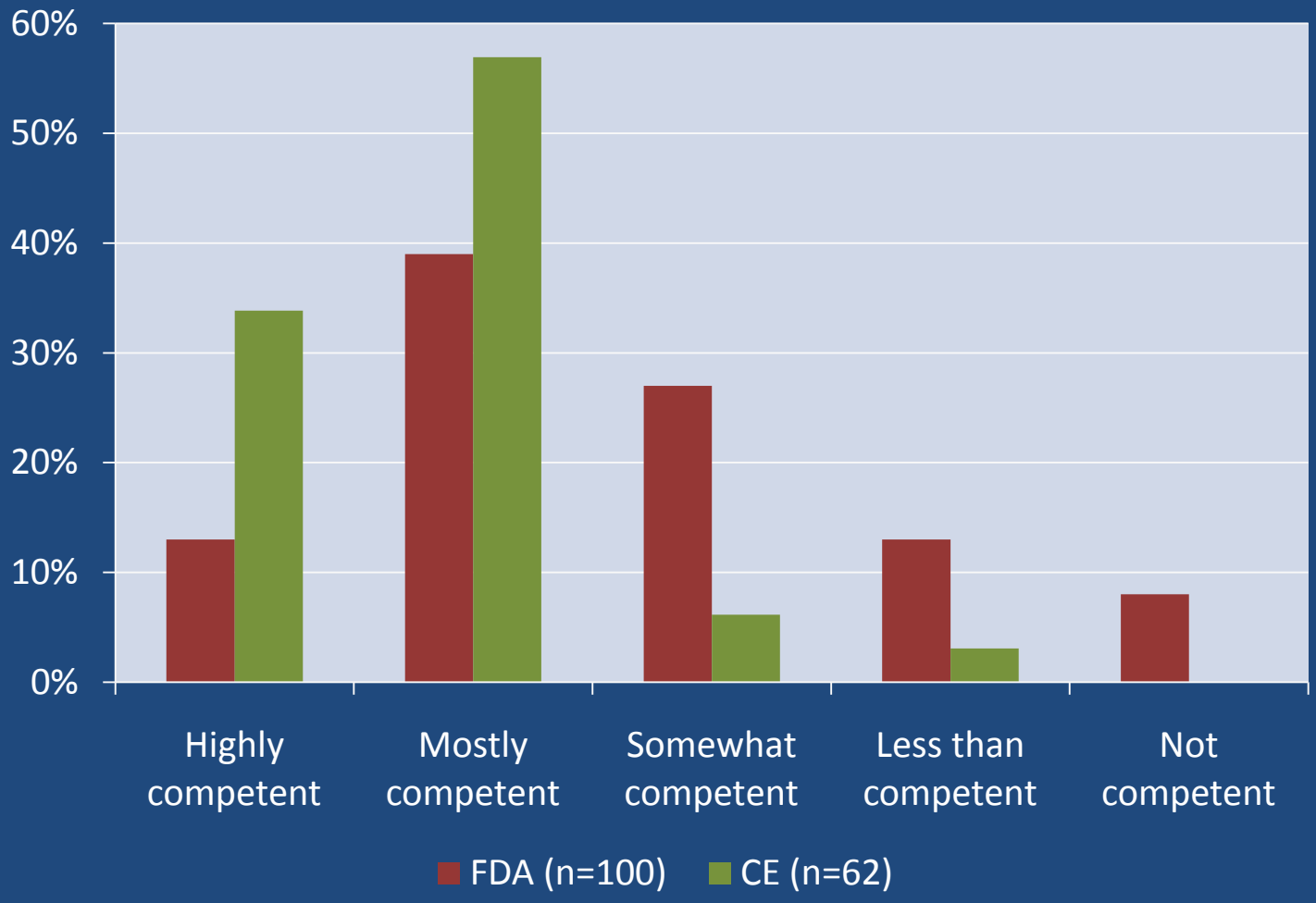
Relative perspectives on FDA performance

- The question has been asked if concerns over the current FDA policies are from a small vocal minority or widely shared views. This next section of the survey was intended to reveal insights on this question.
- Companies were asked to comment separately on FDA and European Authority competence, predictability, transparency, reasonability and overall performance.
- For reasons cited earlier, several participants answered some but not all of these questions.
- More participants had experience with the FDA, than with European authorities, but a majority had experience with both.

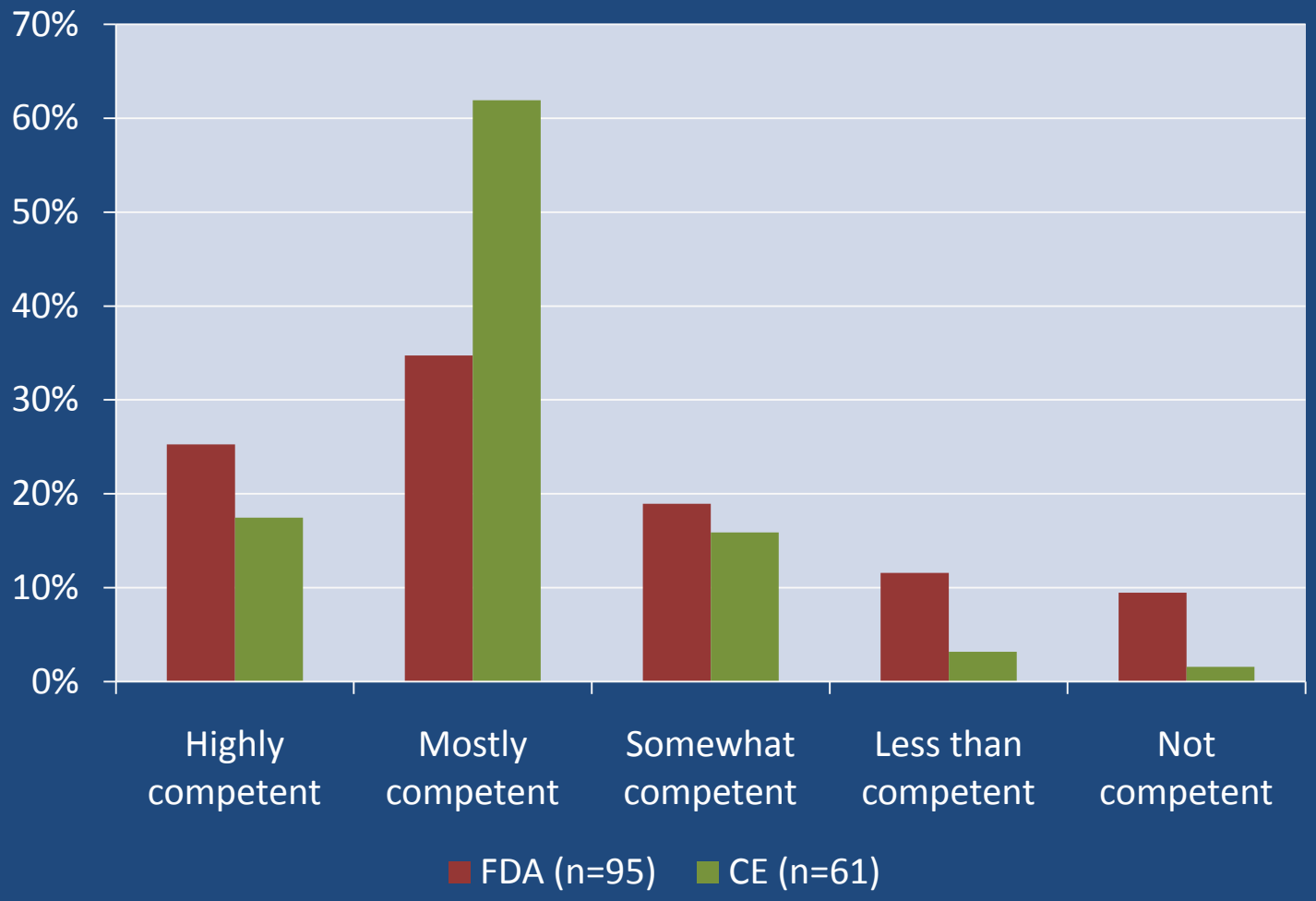
European authorities rank ***better*** in clinical competence



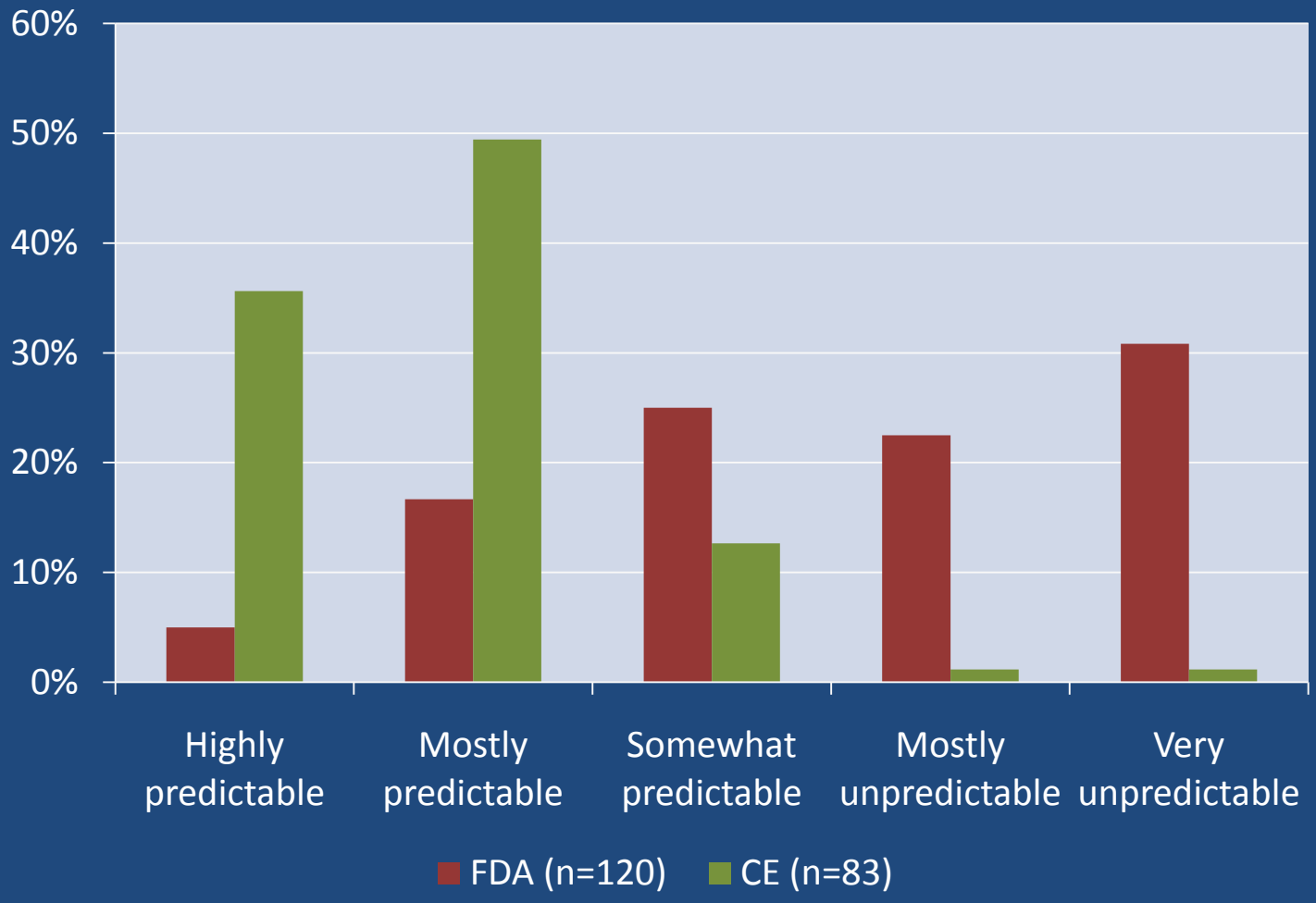
European authorities rank ***better*** in engineering competence



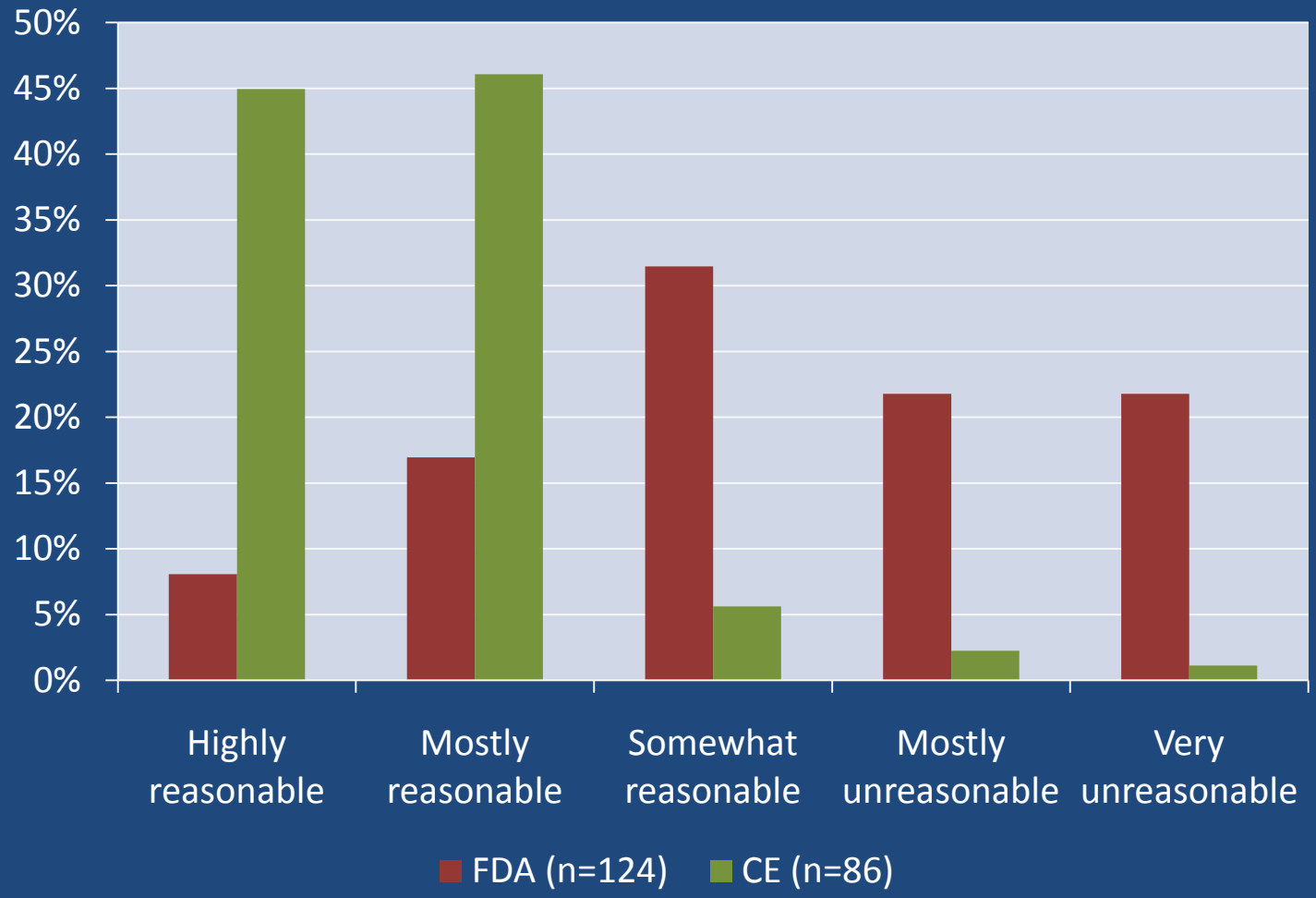
European authorities rank ***better*** in statistical competence



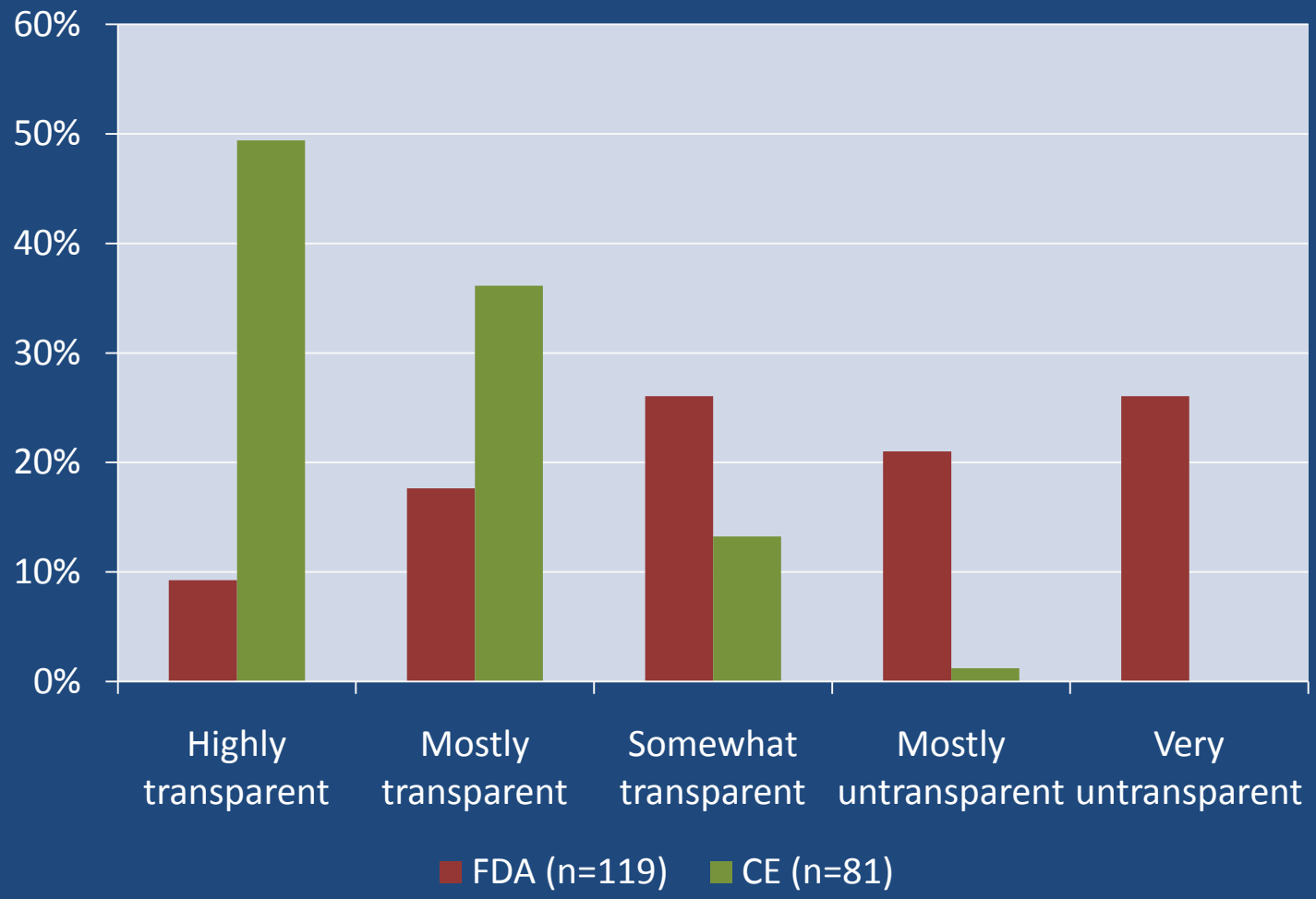
European authorities are viewed as ***more*** predictable



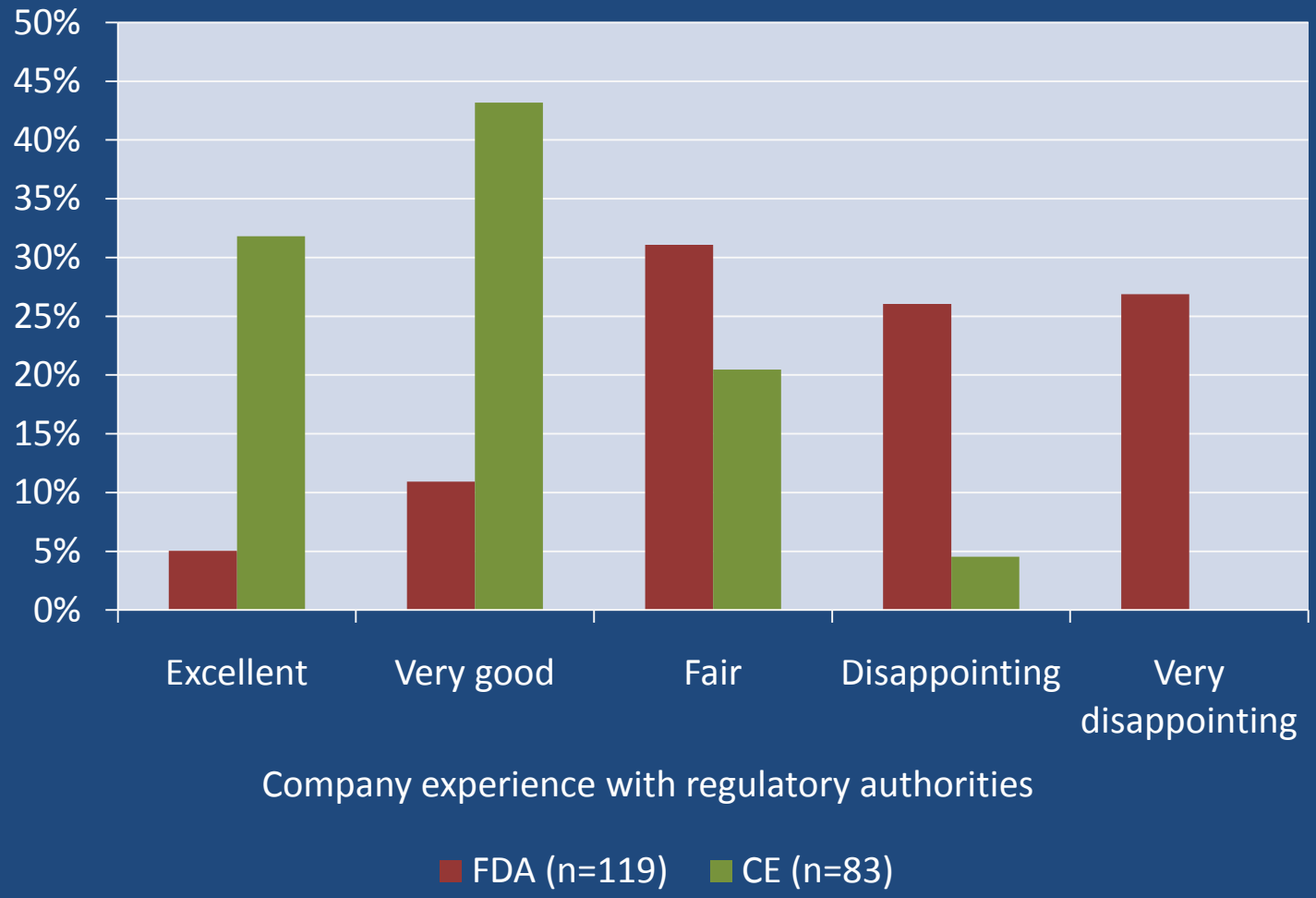
European authorities are viewed as ***more*** reasonable



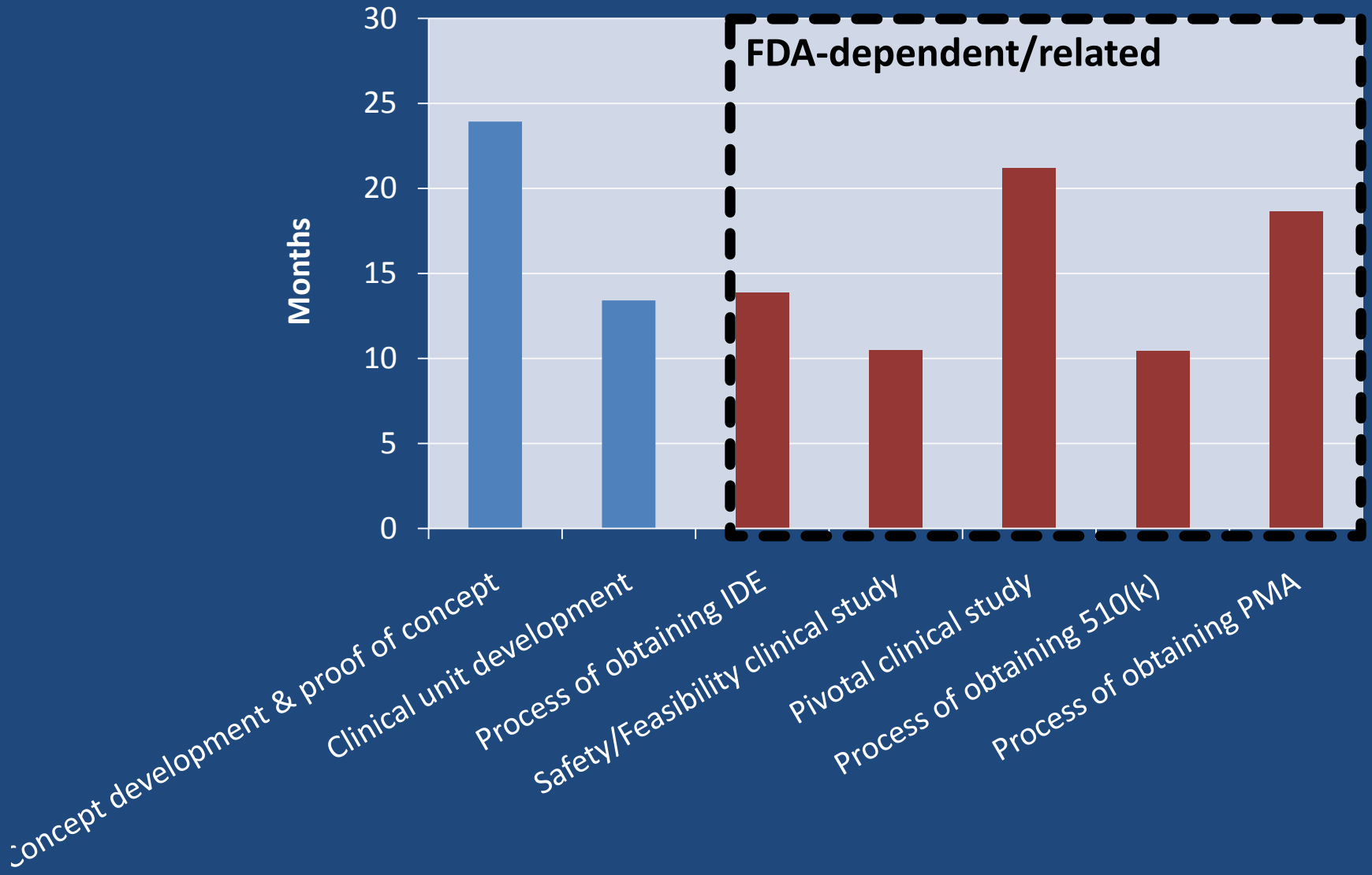
European authorities are viewed as ***more*** transparent



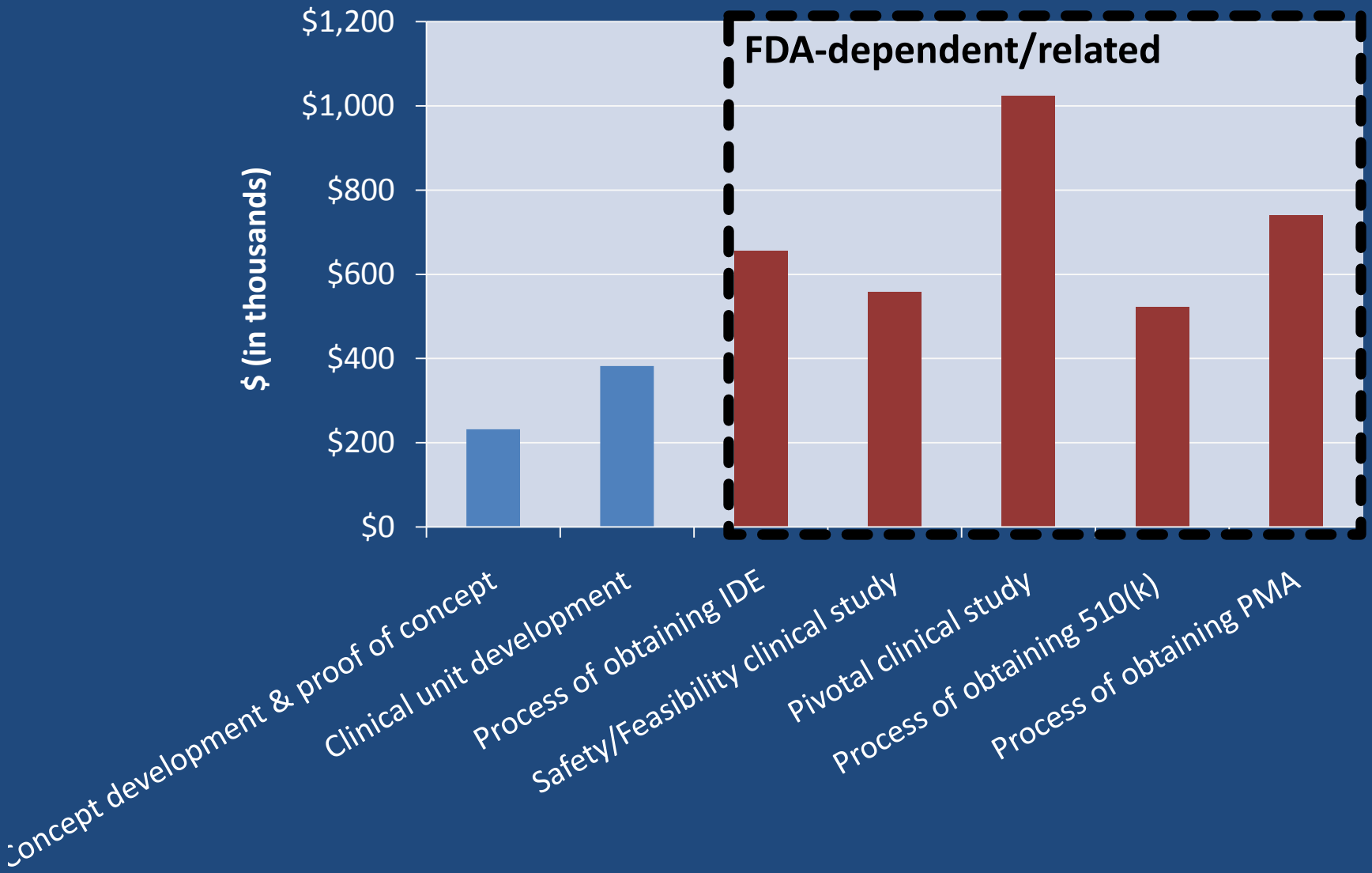
European authorities rank ***better*** overall



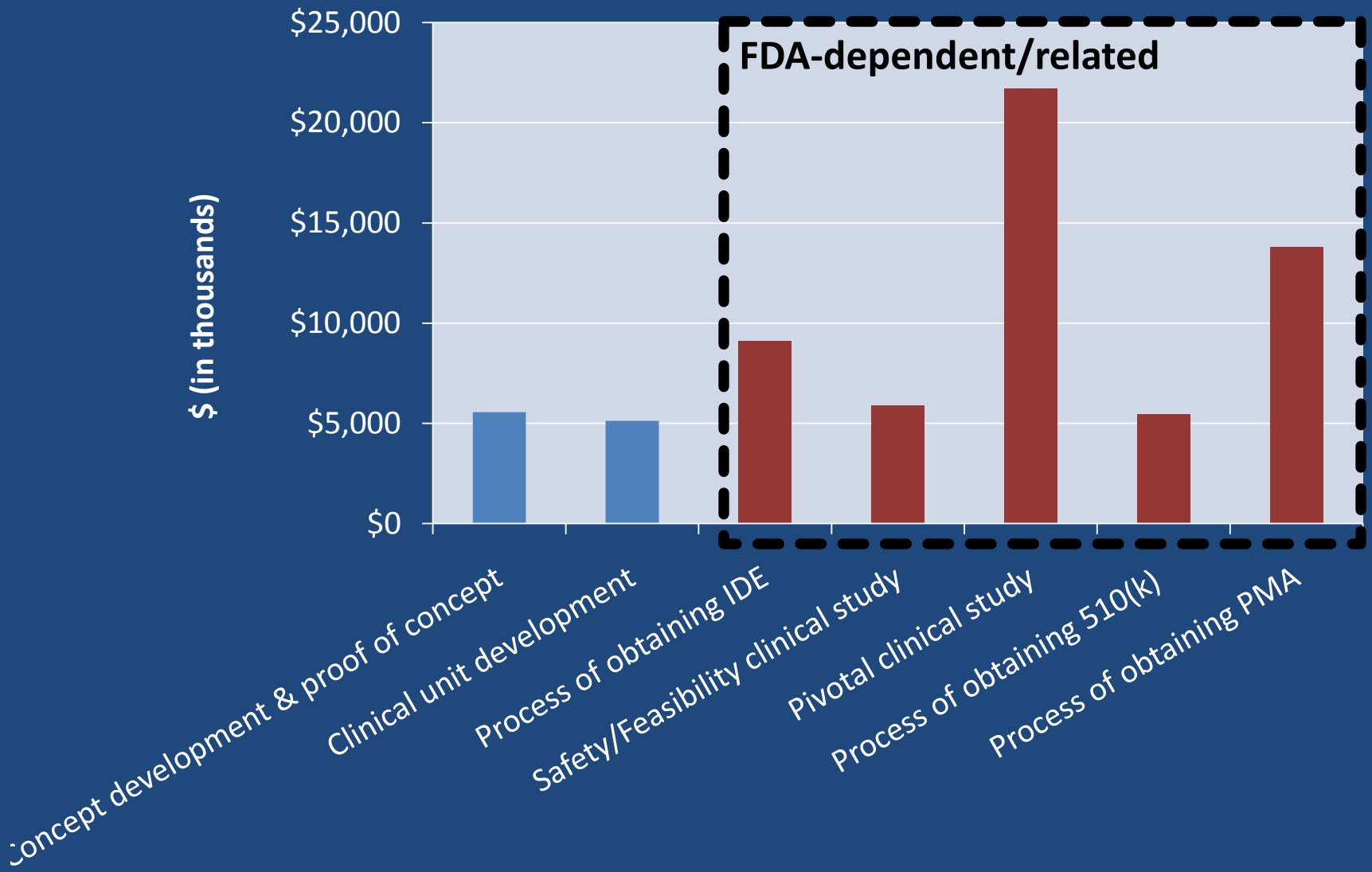
Current average time required for each medtech development stage



Current average expenditure per month for each medtech development stage



Total average expenditure to navigate each medtech development stage



Cost to clear/approve a medical device

- $31,000,000* on average to bring a 510(k) product from concept through clearance
  - With $24,000,000 spent on FDA-dependent/related aspects

- $94,000,000* on average to bring a PMA product from concept through approval
  - With $75,000,000 spent on FDA-dependent/related aspects

*__Does not__ include reimbursement approval and sales/marketing costs.

This study clearly documents the costs to patients as well

- Patients in the US wait an average of **2 yrs longer** (3 – 70 months) than Europeans to gain access to new US created medical technologies

- Due to these substantial delays, it costs millions more to bring products to the US than Europe

- Based on the prevalence of the diseases addressed by the companies in the study, millions of Americans are currently being impacted by these delays

Summary

- From the perspective of medtech companies innovating new medical technologies in the US:
  - **FDA substantially lags behind Europe** in several performance indices
  - Many US medical technologies are available outside the US **long before they are available to US citizens**
  - Reported FDA review times **drastically underestimate the actual time required** to navigate the FDA process to obtain clearance/approval
  - Due to delays and inefficiency in the process, companies navigating the US regulatory environment incur **substantial incremental cost.**
  - A majority of medtech companies feel they have been **negatively impacted by the current FDA environment**

Acknowledgements

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Thank you.