

Disclosures



Dr. Simen is currently employed by Takeda Development Center Americas, Inc. and holds stock in the company.

Biomarkers and drug development

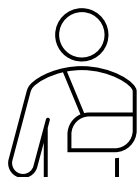


Phase Success	Phase I to II		Phase II to III		Phase III to NDA/BLA		NDA/BLA to Approval	
	n	Phase POS	n	Phase POS	n	Phase POS	n	Phase POS
Neurology	516	47.7%	504	26.8%	226	53.1%	165	86.7%
Likelihood of approval	Phase I to Approval		Phase II to Approval		Phase III to Approval		NDA/BLA to Approval	
	n	Phase POS	n	Phase POS	n	Phase POS	n	Phase POS
Neurology	1411	5.9%	895	12.3%	391	46.0%	165	86.7%

Clinical Development Success Rates and Contributing Factors 2011–2020. Bio/, PharmaIntelligence, QLS.

5.7 Billion US dollars and 13.3 years to develop a drug for AD.

Cummings et al. Alzheimer's & Dementia: Translational Research & Clinical Interventions 4 (2018) 330-343



Who to enroll?



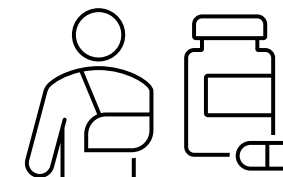
Target engagement



Pathway engagement



Modification of
disease biology



Prediction of trial
outcomes

Multimodal biomarkers can provide “off-ramps” in the form of data-based decision points for drug development to allow programs that will likely fail to be terminated early, thereby reducing financial risk and freeing up resources for more promising drugs to be evaluated.

What is needed to achieve this?



- **DISCOVERY** of informative biomarkers for the targeted condition.
- **LONGITUDINAL** data to support trial planning.
- **REPRESENTATIVE** data that reflect the intended patient population (similar disease stage, age, gender, race/ethnicity, etc.) including very early-stage and pre-symptomatic patients.
- **EXTENSIVE** data to provide good precision for estimates of effect size, test-retest reliability, etc.
- **MULTIMODAL** data (including biomarkers and clinical data in the same study) because parallel changes in other biomarkers and clinical endpoints significantly improves confidence and utility.
- **REPLICATION** in independent cohorts by independent investigators is highly desirable.
- **ANALYTICS** need to be adequately resourced along with data collection.
- **DATA SHARING AND ACCESS** are critical to bring data to bear on informing trials.

Bringing effective therapies to patients will rely critically on the availability of better fluid, imaging and digital biomarkers. Extensive public-private collaboration will be needed to achieve these goals.