Impact of Patient Engagement on Project Valuation

Bennett Levitan, MD-PhD

Epidemiology, Janssen Research and Development

CTTI Patient Groups & Clinical Trials Expert Meeting

January 22, 2015

Disclosures

- Bennett Levitan is employed by Janssen R&D, a health care company developing numerous pharmaceuticals.

- Bennett Levitan owns stock in Johnson & Johnson and is invested in financial portfolios that own stock in companies undertaking clinical development of pharmaceuticals.

Agenda

- **An approach to project valuation**
- **Impact of patient engagement on valuation drivers**

5 Key Drivers of Pharmaceutical Project Value

- **Revenue**
  - What financial benefits accrue from project success?
- **Cost**
  - Resource: What resources are expended developing the project?
  - Opportunity: What is not done while resources are committed?
- **Time**
  - When do the costs, revenue and risks occur?
  - Can risks be resolved before major resource commitment?
- **Risk ...**
- **Intangibles**
  - Patient health and satisfaction
  - Strategic relevance
  - Precedent
  - Reputation
  - …

Many Manifestations of Risk as a Key Driver

- **Technical risk**
  - Will we choose to advance development after each study?
    - Efficacy, safety, competitors, management, payers, etc.
- **Regulatory risk**
  - Will the health authorities approve this treatment and as planned?
- **Operational risk**
  - Will we complete each study in the expected time?
  - Will the regulatory review complete in the expected time?
- **Resource risk**
  - Will the studies cost what we expected?
  - Will the staffing requirements be what we planned for?
- **Forecasting risk**
  - How will actual revenue compare to predicted revenue?

How can we consider these drivers collectively?

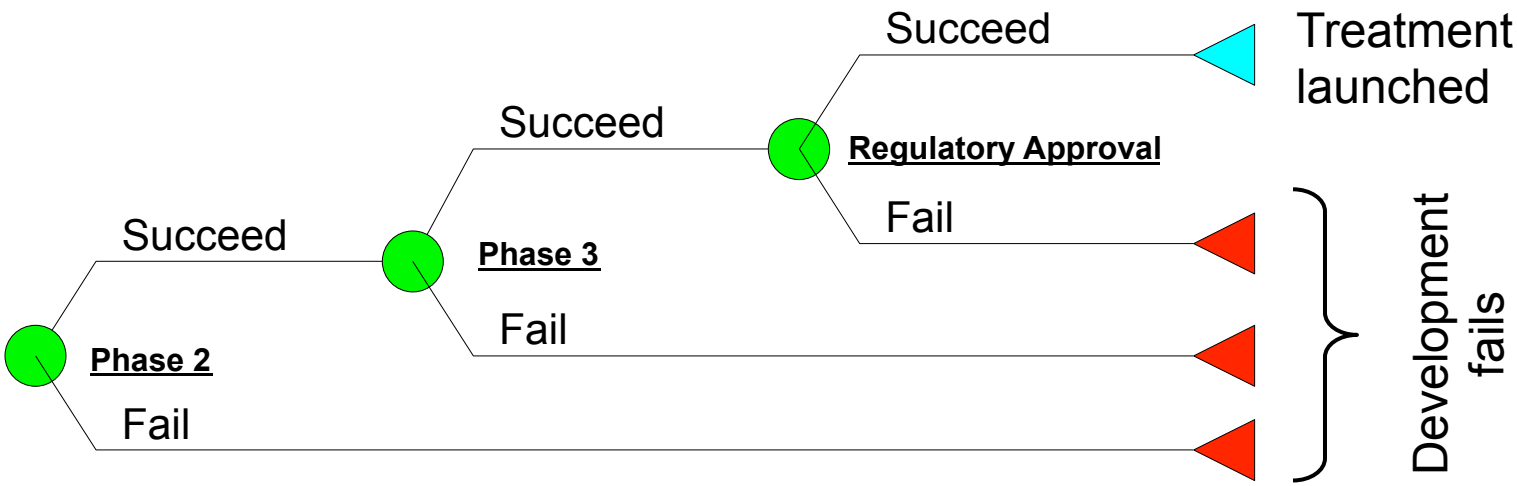
One General Approach for Project Valuation

- **Break apart the different paths towards success and failure**
- **Assess the costs, revenue, risks and timing associated with each separately**
- **Calculate metrics associated with the paths collectively**

- **Two metrics we will consider**
  - Probability of technical and regulatory success (PTRS)
  - Expected net present value (ENPV)

Break apart the different paths towards success and failure

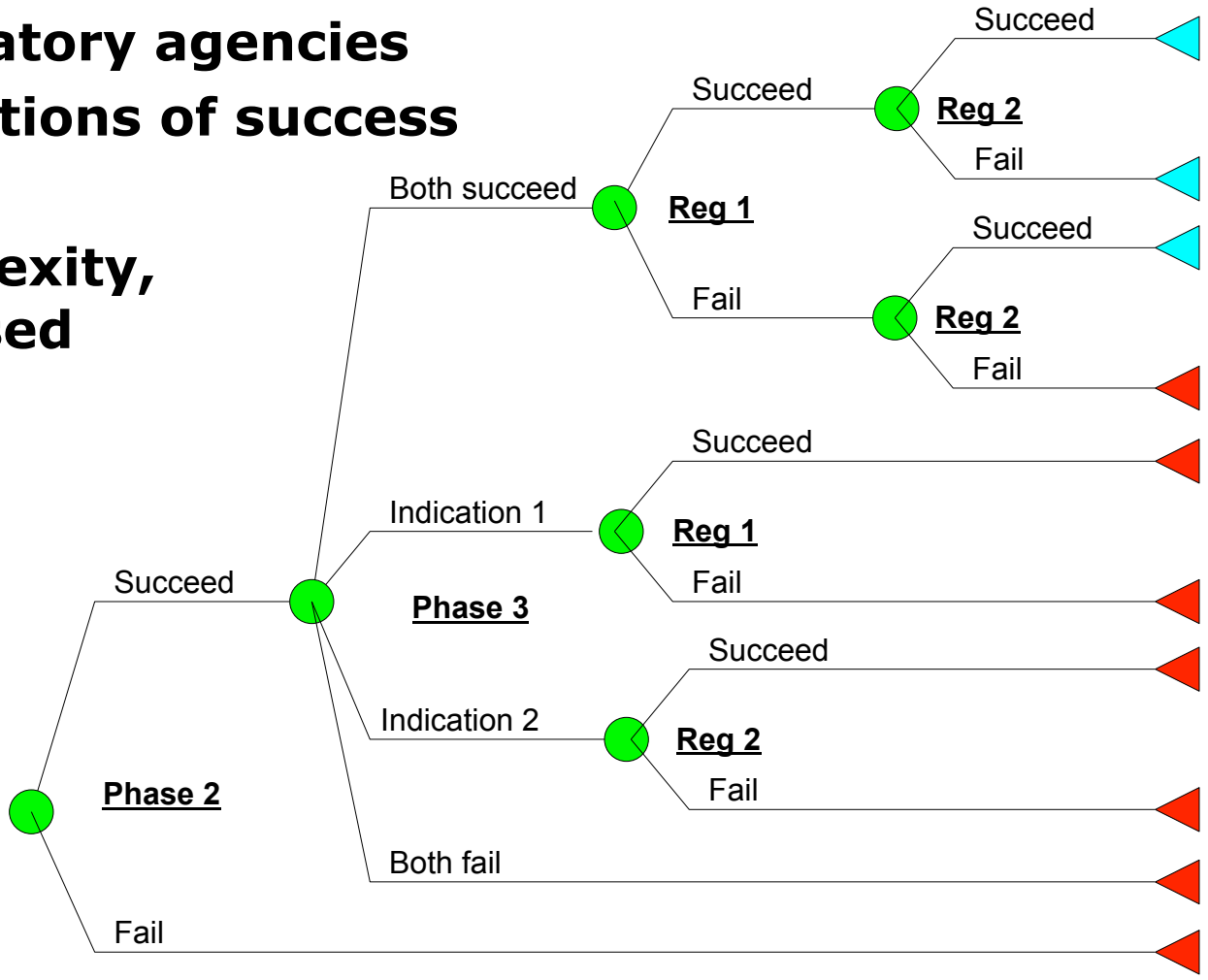
- **Circles represent studies or other key risky events**
  - Branches indicate success or failure of the event
- **Success of one event brings the opportunity to attempt the next**
  - Definition of success generally based on study protocol, target product profile, good clinical practices



Real World is Often More Complex

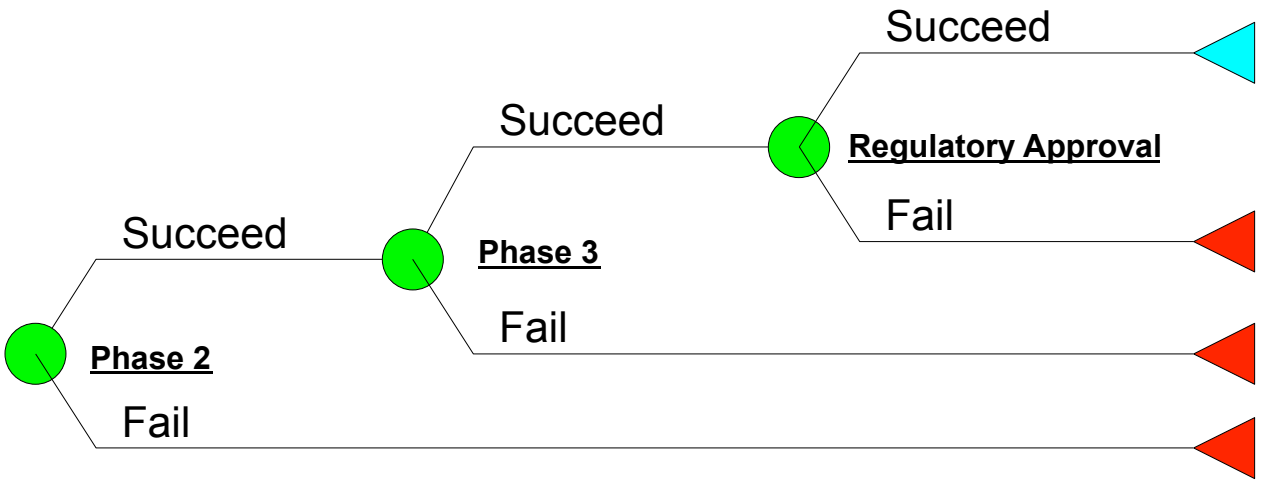
- **Multiple indications**
- **Parallel development paths**
- **Multiple regulatory agencies**
- **Multiple definitions of success**

- **Despite complexity, approach is used**



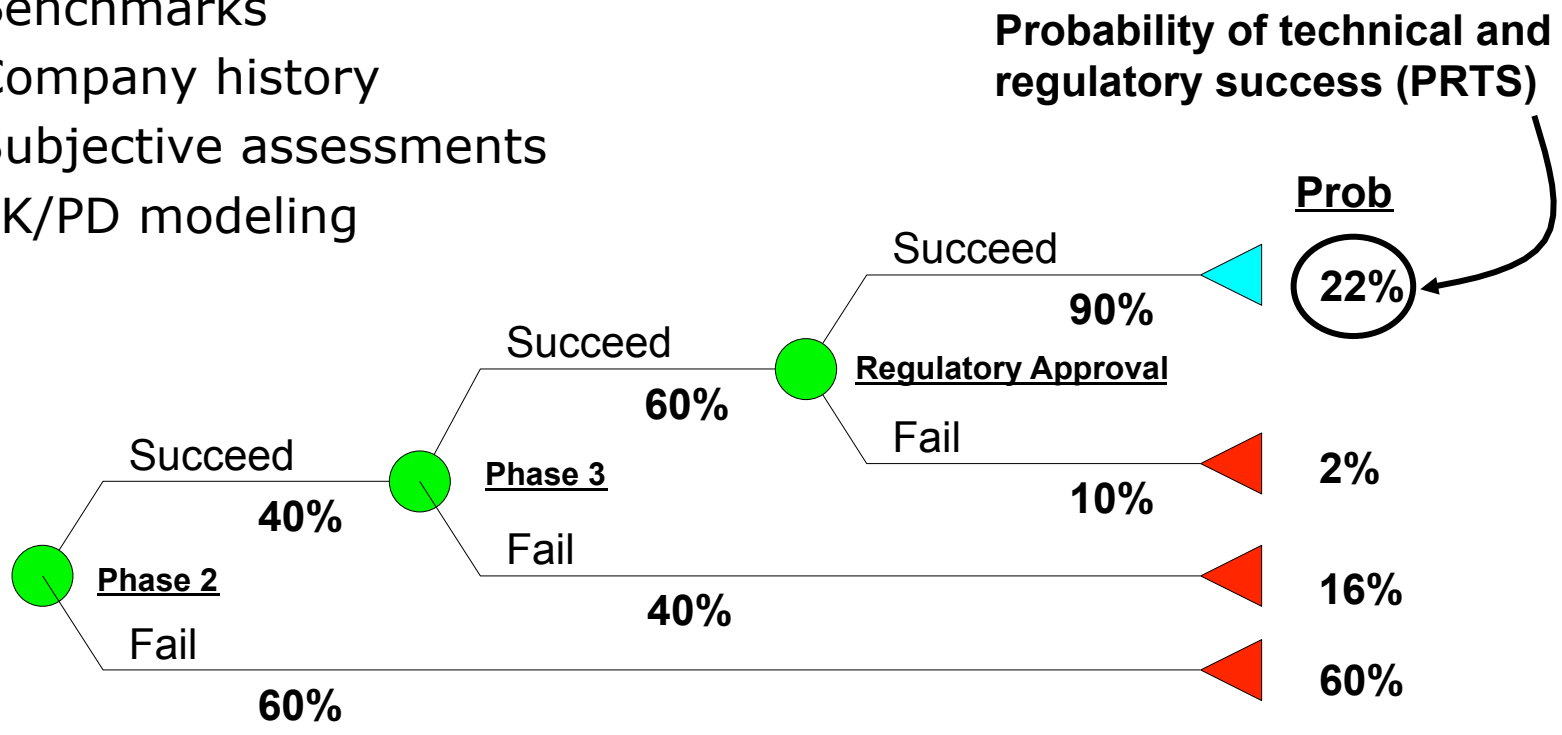
Break apart the different paths towards success and failure

- **Circles represent studies or other key events**
  - Branches indicate success or failure of the event
- **Success of one study brings the opportunity to attempt the next**
  - Definition of success generally based on study protocol, target product profile, good clinical practices



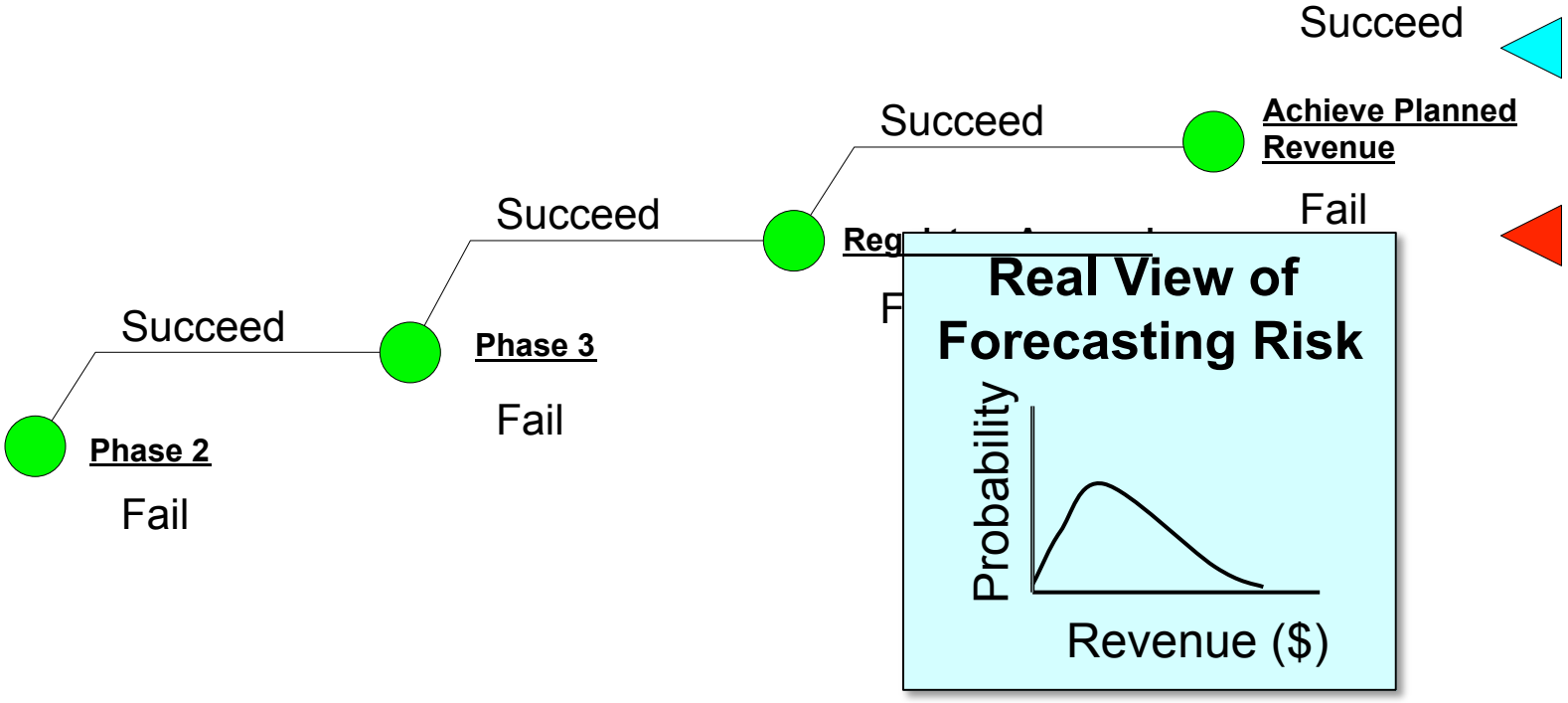
Including Technical and Regulatory Risk

- **Characterize the technical uncertainty of each event with probabilities of success (POS or PTS)**
- **Several means to assess probabilities**
  - Benchmarks
  - Company history
  - Subjective assessments
  - PK/PD modeling



Is Regulatory Approval a "Success"?

- **Increasingly, regulatory approval is insufficient**
  - Need patients and physicians to value the product
  - Need approval to reimburse
  - Needs payers to place product on formulary
- **Should incorporate forecasting risk**

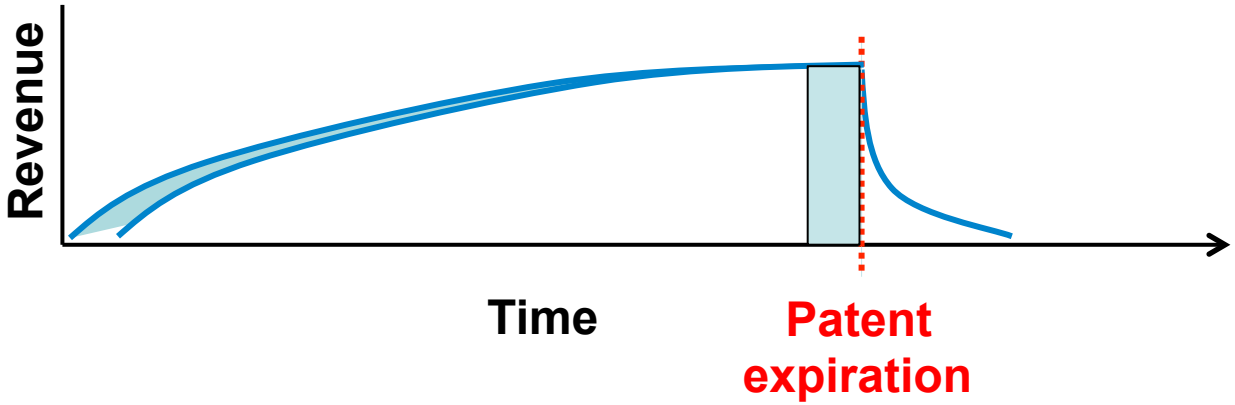


Interaction of Revenue and Time

- **Time value of money**
  - $1000 next year is worth less than $1000 today
  - $1000 in two years is worth even less
- **Why?**
  - Can invest the $1000 in less risky opportunities and have more funds in the future
- **How characterize the effect of time?**
  - "Present value" of money and "net present value" (NPV)
  - Calculation is straightforward
  - Critical point: Delaying the launch of a product can greatly reduce the value of the product
  - Impact can be tremendous.
    - A year's delay can reduce NPV by 10%!
    - Old saw: "A million dollars a day"

Additional Impacts of Time of Forecast

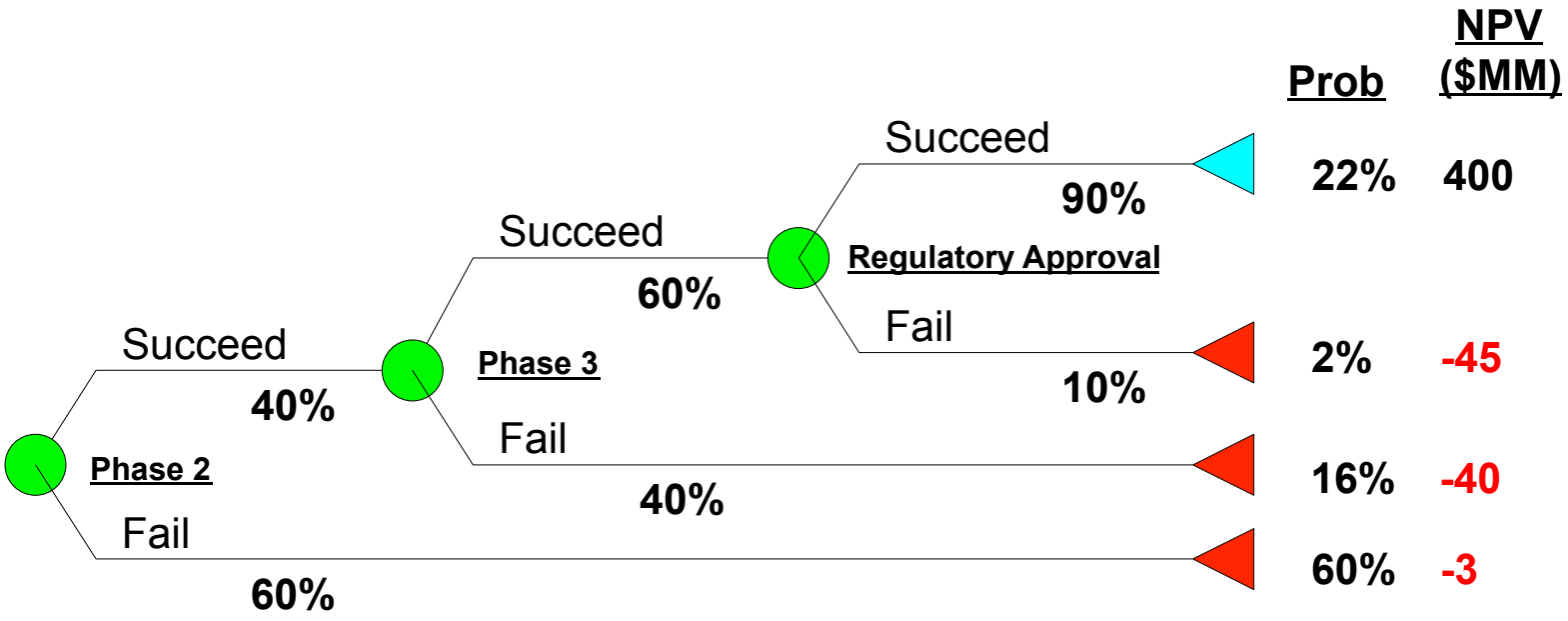
- **First to market**
  - The first treatment in a given disease a higher chance of achieving large market share and being reimbursed
  - Also advantages to second to market vs. third, etc.
- **More time until patent expiration**



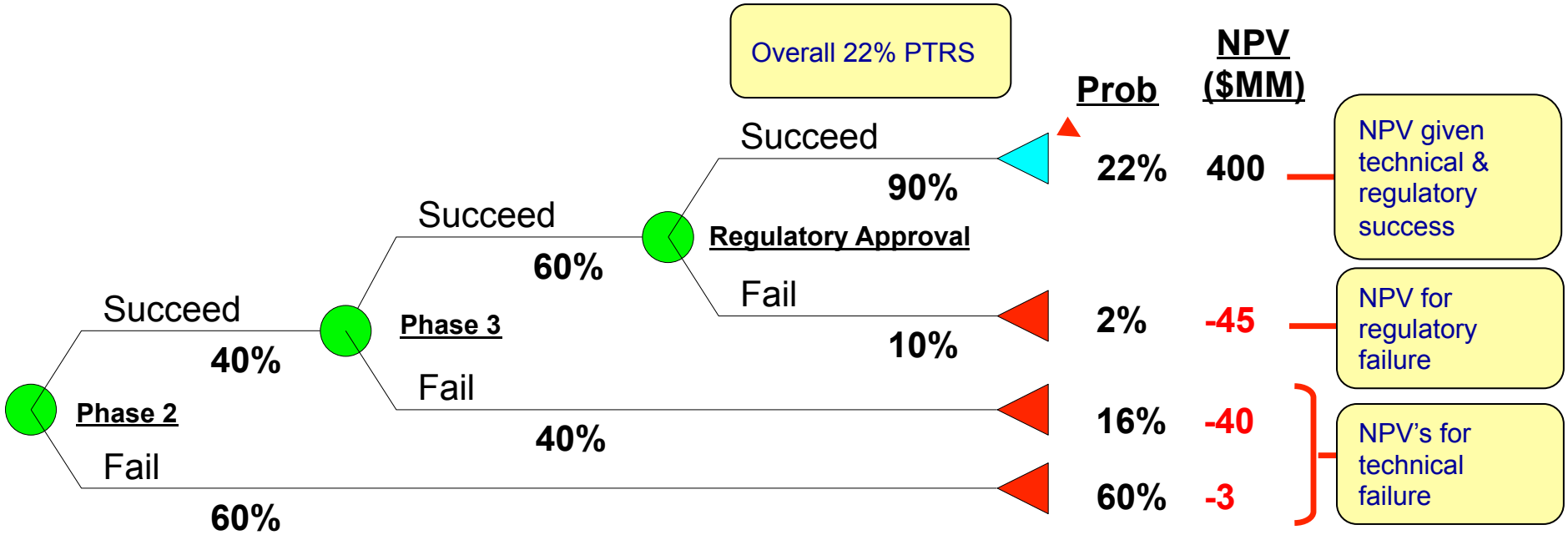
  - Huge impact at patent expiration
  - Earlier launch increases time until revenue curve decays

Including Cost, Revenue and Time

- **Each development path has an associated cost or reward**
- **Characterize these costs/rewards in present value terms**
- **More steps → more cost**



Putting it all together: ENPV
Expected Net Present Value



ENPV = "Expected Net Present Value"

= Average NPV adjusted for regulatory & technical risk

= 0.22 x 400 – 0.02 x 45 – 0.16 x 40 – 0.60 x 3 = $77 MM

Role of ENPV

- **Encapsulates cost, revenue, time, technical risk and regulatory risk**
- **Can be augmented to account for operational and resource risk**
- **Extremely valuable metric for**
  - Choosing between different plans for a product
  - Comparing products
  - Assessing a portfolio of products
- **And**
  - Assessing the impact of patient engagement

Agenda

- **An approach to project valuation**
- **Impact of patient engagement on valuation drivers**

Patient Group Engagement Across the Clinical Trial Continuum

Building a model to evaluate impact

Pre-Discovery

- Interest of research question to patient community
- Provide data on unmet need and therapeutic burden
- Direct funding and fund raising for research or product development
- Understanding mechanisms of action relevant to disease and symptom burden

Pre-Clinical

- Direct funding and fund raising for research or product development
- Natural history database/registry support
- Help define eligibility criteria within the study protocol
- Feedback on meaningful clinical endpoints
- Assist in creating the informed consent form
- Advise on study recruitment
- Accompany sponsor to FDA to advocate study design

Phase 1

- Network recruitment / outreach
- Direct funding and fund raising for research or product development
- Infrastructure support
- Provide input on study design (barriers to participation)
- Support trial awareness and recruitment
- Peer advocate during informed consent procedure

Phase 2/3

- Direct funding and fund raising for trial operations support
- Network recruitment / outreach
- Serve on a Data Safety Monitoring Board
- Report on patient feedback regarding sites, investigators, and study participant experience
- Serve in preference studies for benefit-risk assessment

FDA review & approval

- Serve on FDA advisory committees
- Provide testimony at FDA hearings
- Feedback on meaningful clinical endpoints

PAS/ Outcomes

- Natural history database / registry support
- Provide feedback on how the patient community views results
- Help return study results to participants
- Write newsletter articles or blog about results
- Co-present results
- Serve on post-market surveillance initiatives

Provided by CTTI

**Adapted from Parkinson's Disease Foundation materials for CTTI's Patient Groups & Clinical Trials Project*

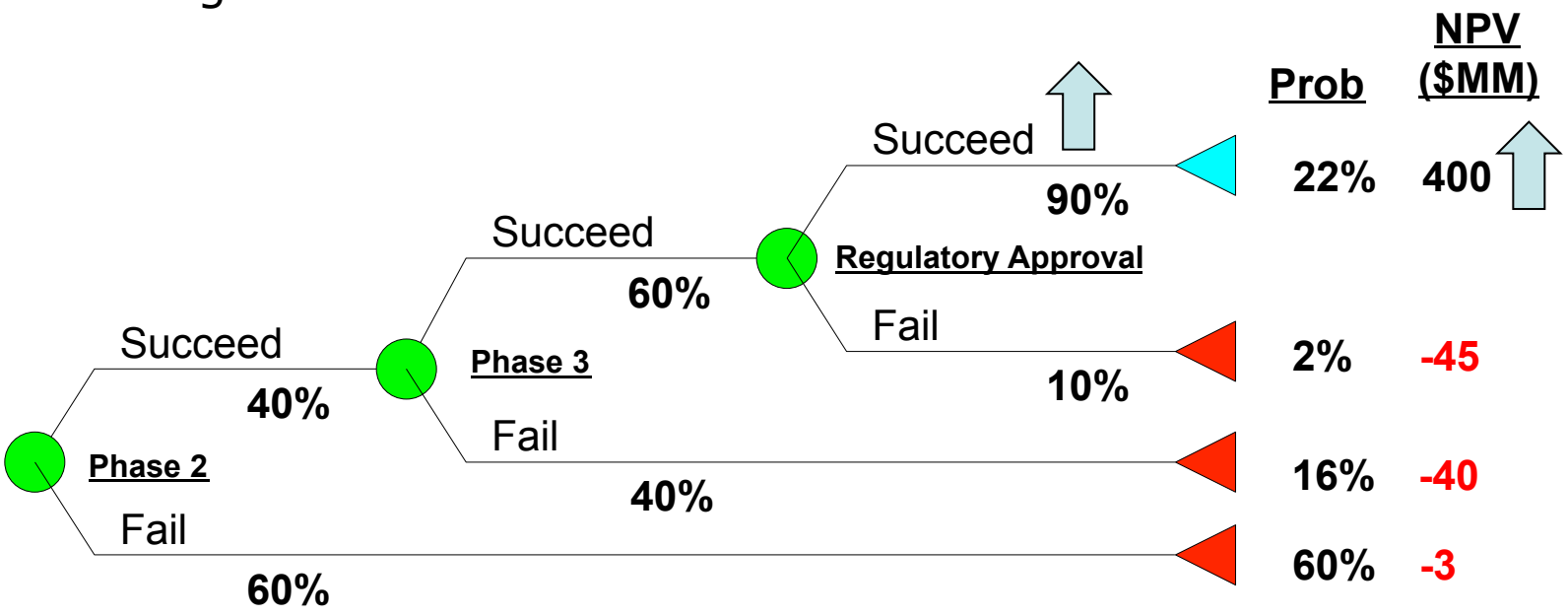
CTTI

Provide information on unmet need, therapeutic burden, benefit-risk of available treatments (therapeutic context)

➔ Need to talk with patient early

- **Impact on valuation**
  - Selection of treatments with greater medical need → less regulatory risk
  - Increased medical need → Increased patient/HCP interest
  - More likely to select the right projects → less opportunity cost

⇒ Improves regulatory risk, revenue, opportunity cost and intangibles

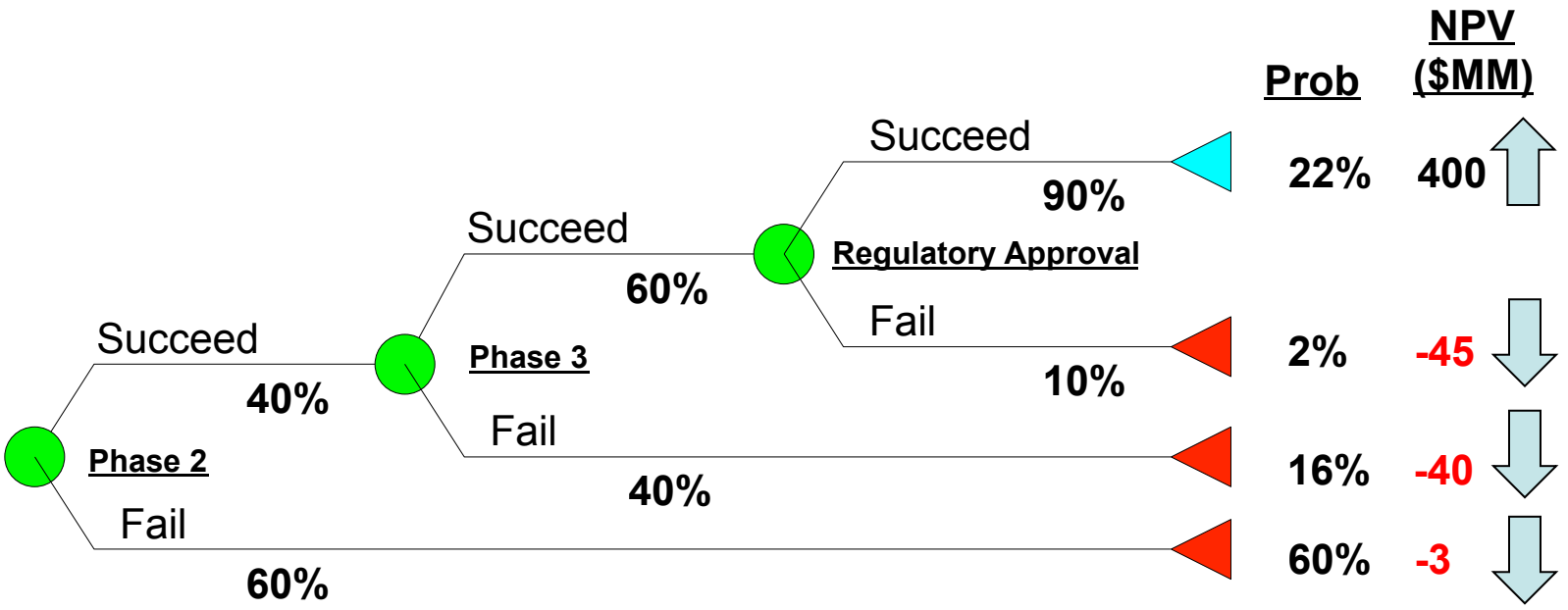


Help finalize eligibility criteria within the study protocol; Assist in creating the informed consent form;

➔ Need to talk with patient early

- **Impact on valuation**
  - Easier to obtain patients → increased rate of enrollment → shorter studies

  ⇒ Improves cost, timing, operational risk and intangibles (patients benefit earlier, reputation boost)

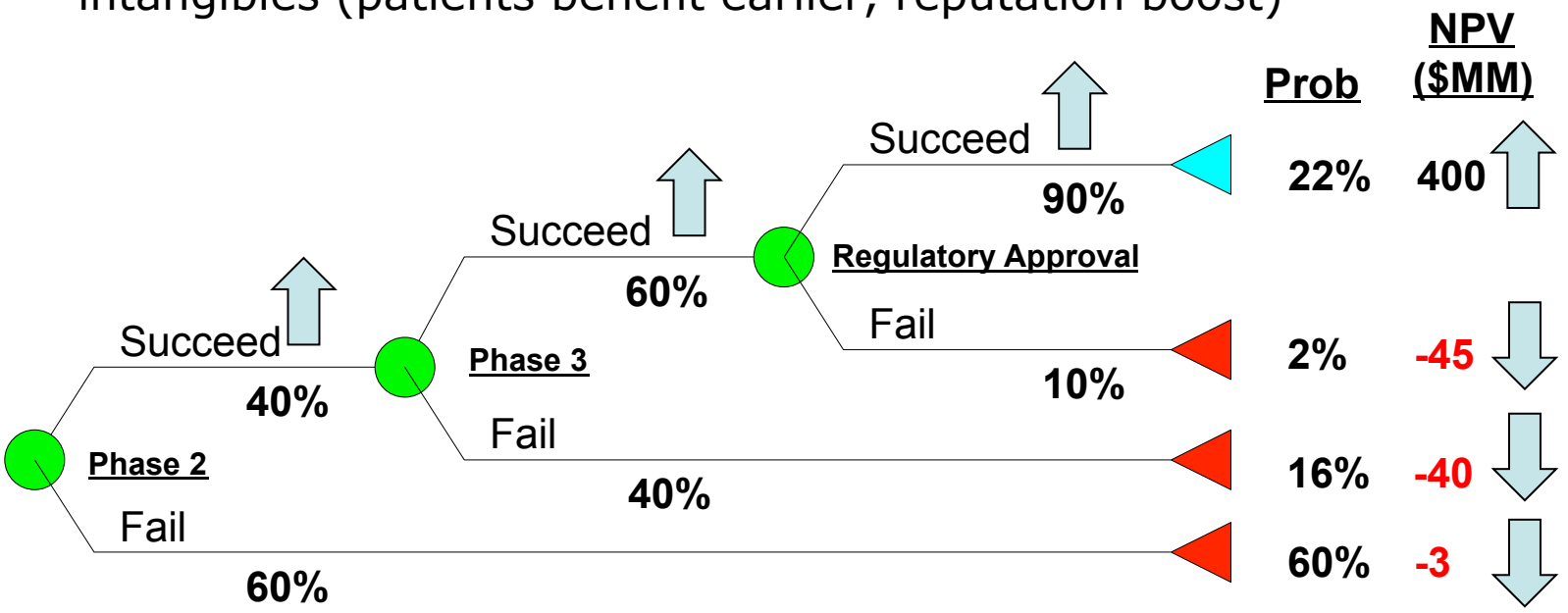


Provide input on study design, barriers to participation

- **Impact on valuation**
  - Increased rate of enrollment → shorter studies
  - Fewer amendments → shorter studies
  - Easier to participate → higher compliance with protocol and fewer dropouts → better efficacy and safety and less chance of too much missing data → higher probabilities of success

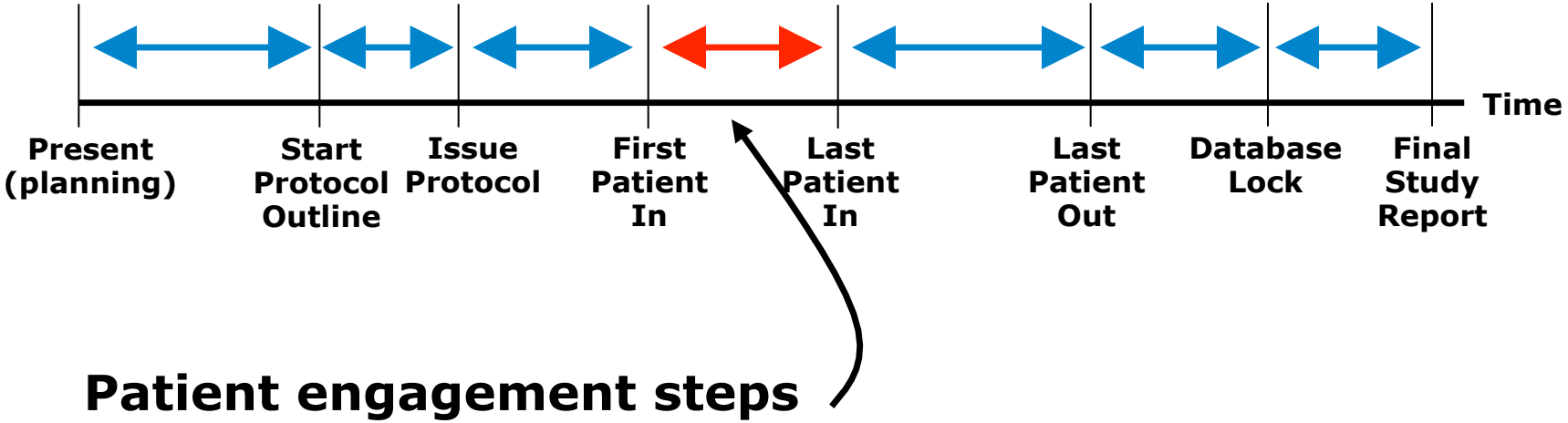
⇒ Improves cost, timing, technical/regulatory/operational risk, intangibles (patients benefit earlier, reputation boost)

→ Need to talk with patient early



How Patient Engagement Impacts Risk:

Typical model for key events in a clinical study



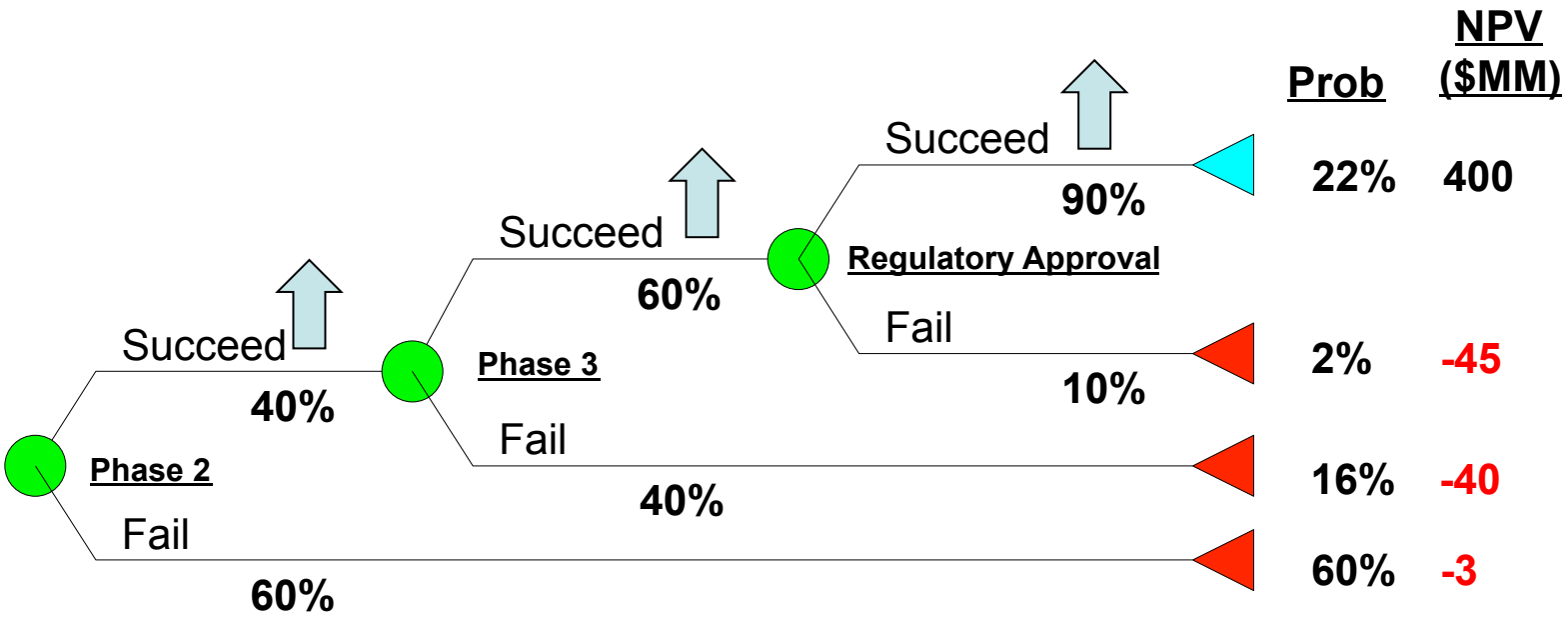
Patient engagement steps that improve enrollment impact here

- **Sponsors have models/estimates for each interval**
- **Can model the impact of patient engagement with changes to the probability that a patient is recruited in a given time**

Serve as a peer advocate during the informed consent procedure

- **Impact on valuation**
  - Better understanding of what to expect → higher compliance with protocol and fewer dropouts → better efficacy and safety and less chance of too much missing data

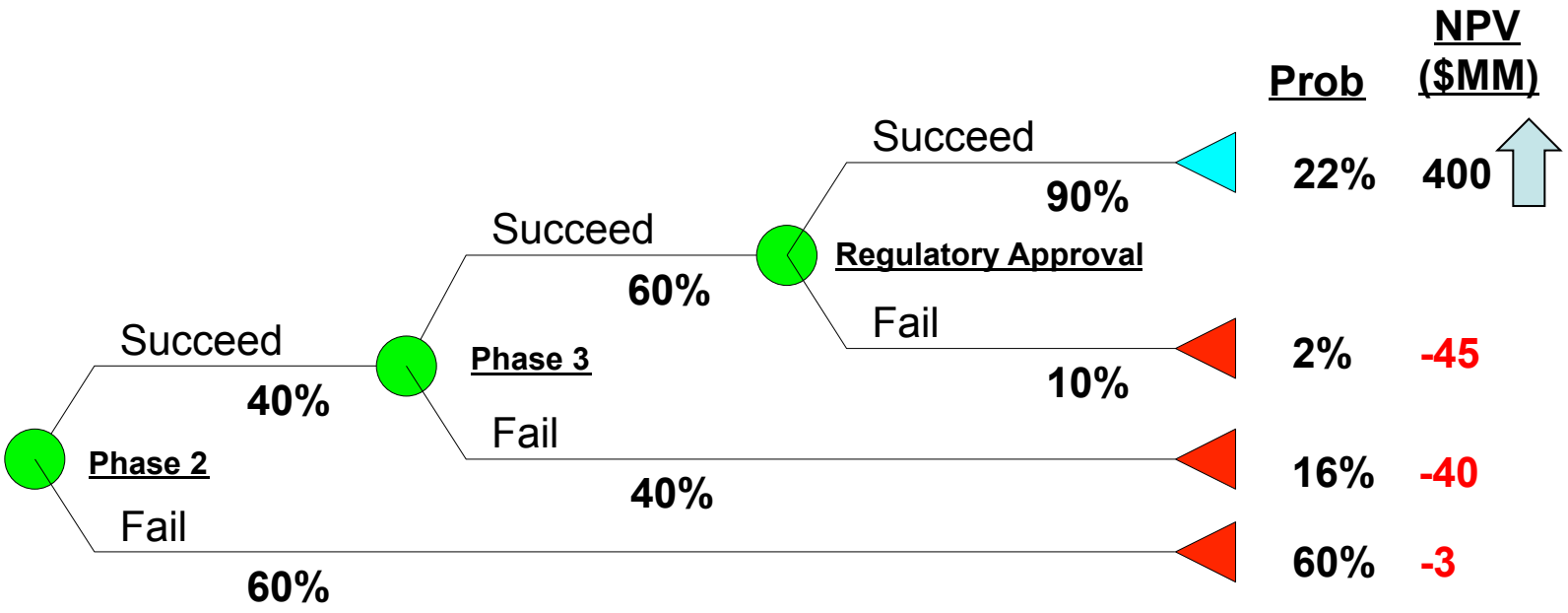
  ⇒ Improves technical risk, regulatory risk, operational risk, intangibles (patients benefit earlier, reputation boost)



Provide feedback on how the patient community will view results

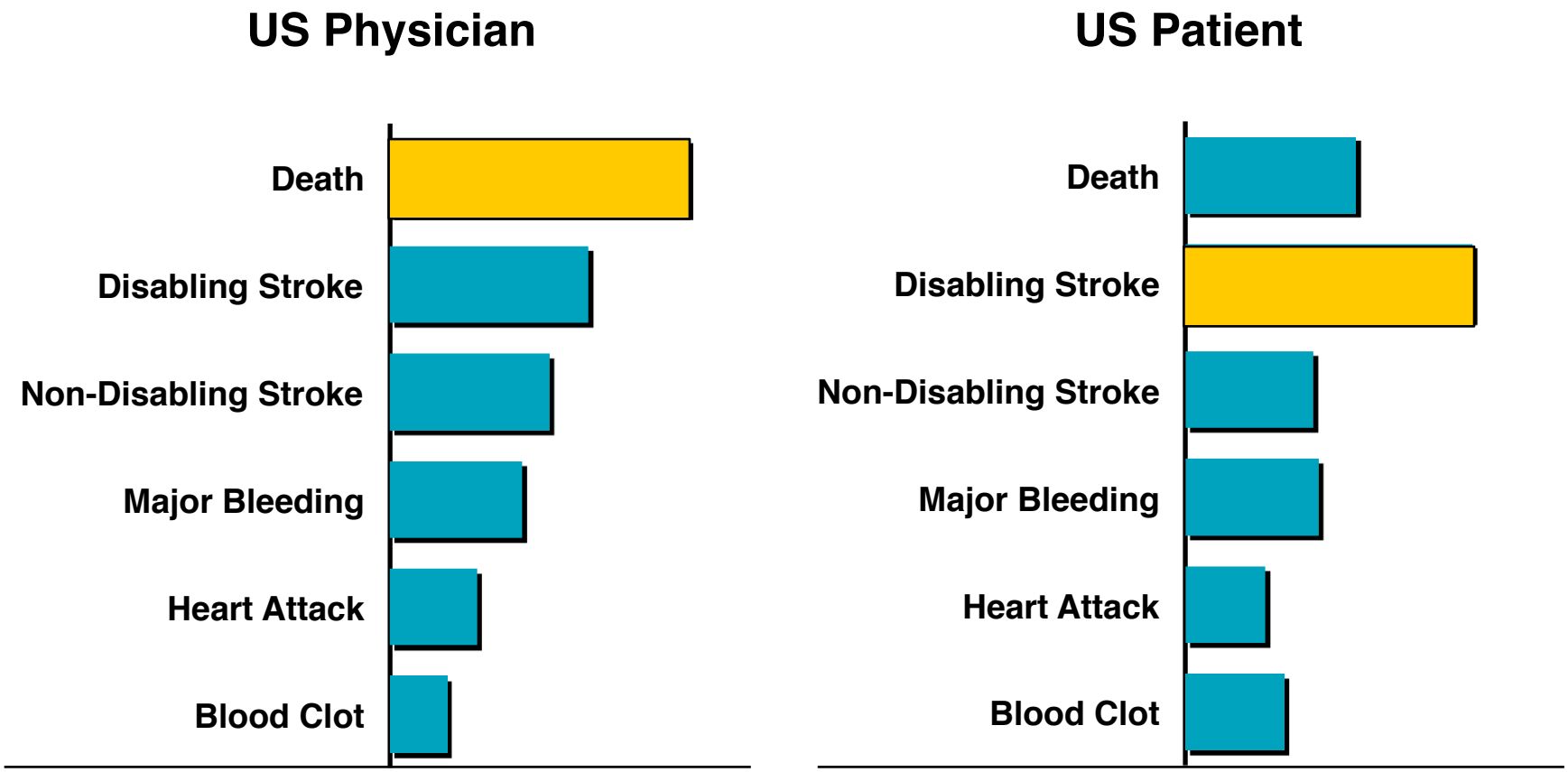
- **Impact on valuation**
  - Increased patient uptake of treatment → higher revenue

  ⇒ Improves revenue and intangibles (reputation boost)



Participate in preference studies for endpoint weighting

Preferences for Anticoagulants in Atrial Fibrillation

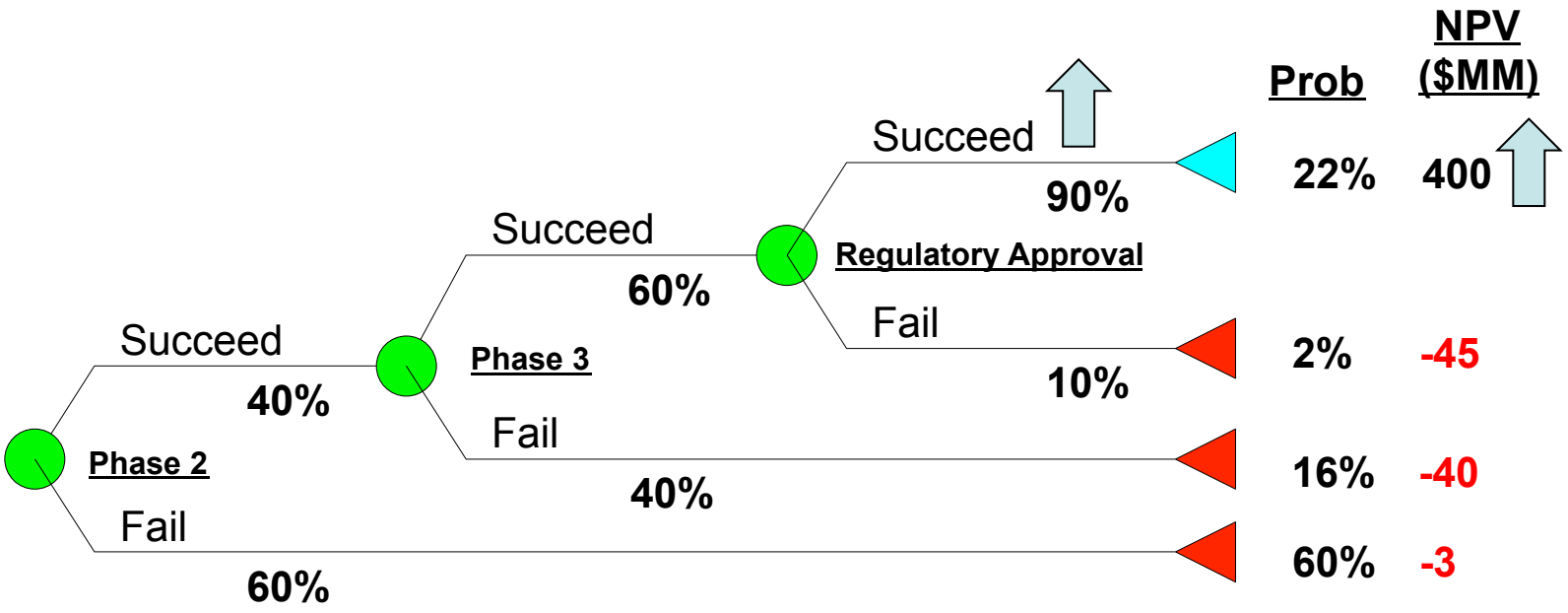


Levitan, Yuan, González, et al., ISPOR 18th Ann Int Mtg, 2013

Participate in preference studies for endpoint weighting

- **Impact on valuation**
  - Improved compound strategy and defense of benefit-risk assessment
  - Stronger case to patients/physicians for use
  - Stronger argument to payers for reimbursement

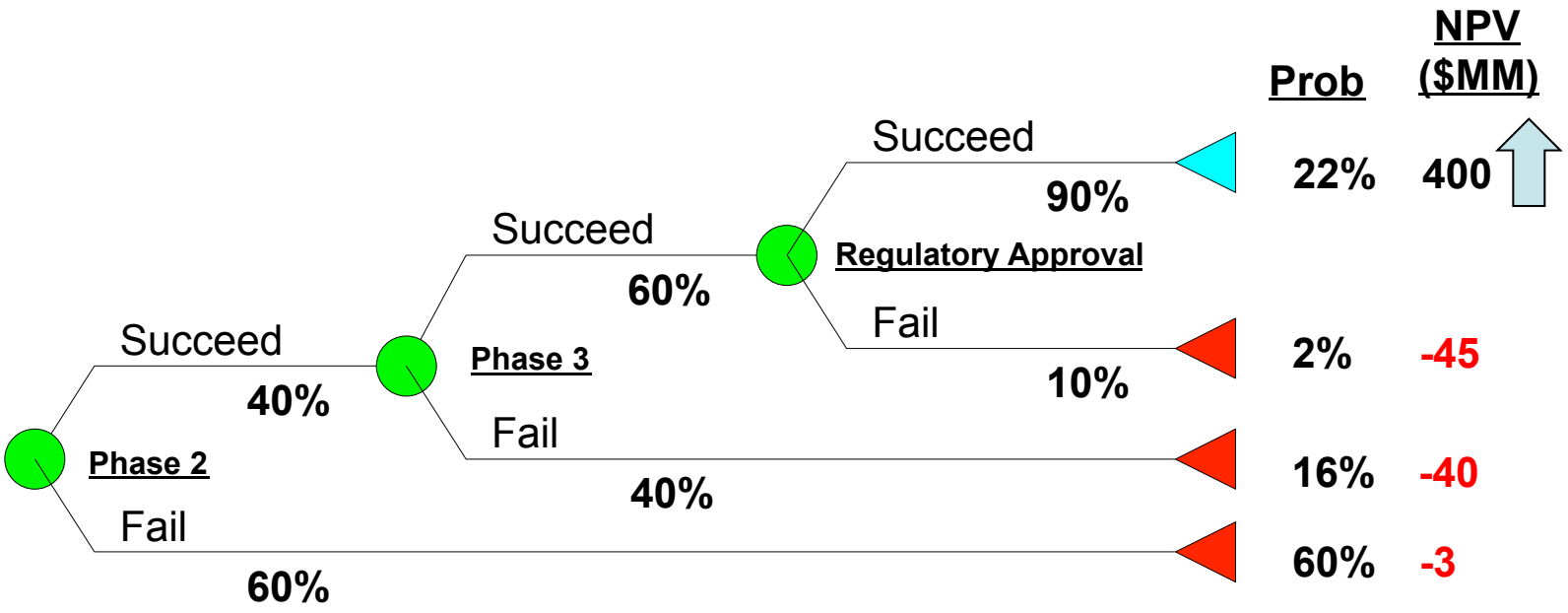
  ⇒ Improves regulatory risk and revenue



Work with sponsor to ensure study participants get feedback from study

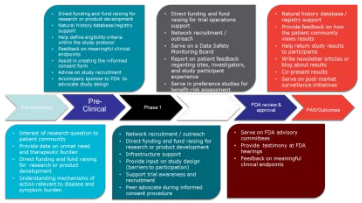
- **Impact on valuation**
  - Stronger case to patients/physicians for use
  - Stronger argument to payers for reimbursement

  ⇒ Improves technical/regulatory risk and revenue



Summary of Valuation Impacts of Patient Engagement (1 of 4)

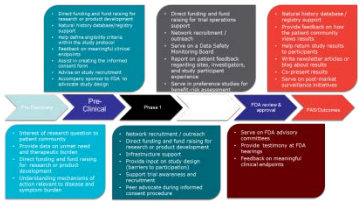
- **Improves enrollment → Reduces time to launch → increases NPV**
  - Study design
    - Help define eligibility criteria within the study protocol
    - Provide input on study design (barriers to participation)
    - Advise on study recruitment
  - Recruiting
    - Network outreach
    - Support trial awareness and recruitment
  - Enrolling
    - Assist in creating the informed consent form
    - Peer advocate during informed consent procedure



Summary of Valuation Impacts of Patient Engagement (2 of 4)

- **Increases probability of technical success (PTS)**
  - Provide input on study design
  - Assist in creating the informed consent form
  - Peer advocate during informed consent procedure
  - Report on patient feedback regarding sites, investigators, and study participant experience

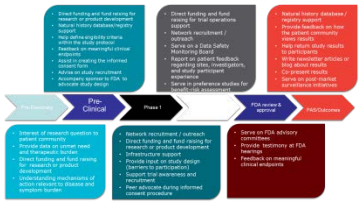
- **Increases probability of regulatory success (PRS)**
  - Provide data on unmet need and therapeutic burden
  - Serve in preference studies for benefit-risk assessment



Summary of Valuation Impacts of Patient Engagement (3 of 4)

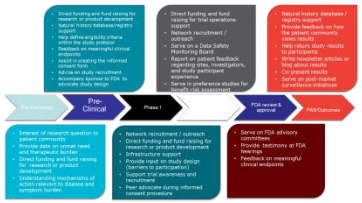
- **Reduces dropout → PRS, PTS**
  - Assist in creating the informed consent form
  - Provide input on study design (barriers to participation)
  - Peer advocate during informed consent procedure
  - Report on patient feedback regarding sites, investigators, and study participant experience

- **Increases adherence → PTS, PRS**
  - Assist in creating the informed consent form
  - Provide input on study design (barriers to participation)
  - Peer advocate during informed consent procedure
  - Report on patient feedback regarding sites, investigators, and study participant experience



Summary of Valuation Impacts of Patient Engagement (4 of 4)

- **Increases revenue**
  - Interest of research question to patient community
  - Provide data on unmet need and therapeutic burden
  - Feedback on meaningful clinical endpoints
  - Serve in preference studies for benefit-risk assessment
  - Feedback on meaningful clinical endpoints
  - Write newsletter articles or blog about results



Conclusions

- **Main drivers of treatment valuation are cost, revenue, timing, risk and intangibles**
- **Expected net present value modeling can account for most drivers in a clear and well-accepted summary metric**
- **Patient engagement activities impact on all drivers for treatment valuation**
- **Many of these driver impacts can be characterized quantitatively and can support sponsor decisions to increase patient engagement in trial development**