FINANCE CONCEPTS IN LICENSING

Valuation Methodology

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Building a Business Development Model

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Why is valuation in life sciences so complex?

**Hi-tech**

9 months = Beta launch (90%+ POS)

**Biotech**

12-15 years = Product approval (5% POS)
Financial Objectives of Licensing

- To add to or protect the value of the company
- To determine what is the value of a product, technology or program to be licensed
- To determine how this value is measured

*We need a valuation methodology*
“Win-Win” is the Key Objective for Licensing

Deals need to be done on a rational basis

- **Entrepreneurs** and **investors** need to be incented to put time and money at risk

- **Pharma** needs to be incented to license products, make money and license more products

*We all want to get the deal done*
Today’s Objective: Develop a Valuation Methodology

Continually and consistently applied Management Tool

Key benefits
– Improves the quality of decisions
– Enables better deal terms

Highly desirable features
– High utility
– Understandable
– Easy to administer and maintain
High Utility of Valuation Methodology

- Supporting transactions
- Facilitating internal management decisions
- Supporting external pricing (e.g., stock price)
Today’s Objective: Develop a Valuation Methodology

Acceptance of results depends on agreement with the method

- Management
- Board of Directors
- Employees
- Prospective licensing party
- Corporate partners
- Investors
- Wall Street analysts

*Need to align key stakeholders*
Valuation Method Should Be Easy to Administer

- Should be consistently applied to all programs
- Should be regularly updated and maintained
  - New information
  - New estimations supported by reason
  - Current financial market data
- Bias-free
  - Input from Finance, Bus Dev, Marketing, Research, Clinical
Valuation Methodologies

1. Sunk Cost
2. Sum of Parts
3. Comparables
4. Discounted Cash Flow (DCF)
5. Risk-adjusted NPV (rNPV)
6. Real Options Analysis
Sunk Costs

• Using paid-in capital to date as a valuation method
• Typical approach says “We’ll give you a 5x return” but in some cases, may not even offer you 100% of paid-in

**Strengths**

• Verifiable (mostly)
• In some cases, guaranteed multiple

**Weaknesses**

• No one will pay for wasted money and may disagree with how money was spent
• Capped upside
• If someone offers you this, it’s because they think your asset is worth a lot more
Situation: Lead product failed and business is being liquidated

Approach asks “What is the value of each asset?”

(Real estate owned/leases, IP, equipment, employment contracts, distribution agreements, existing sales force)

**Strengths**

- Best used with a business that has substantial assets to liquidate (i.e., fire sale)

**Weaknesses**

- Typically receives pennies on the dollar
- Not applicable to ongoing business
Comparables – Product Valuation

- Derives sales and costs based on comparable products
- Example: For an oncology product (cytotoxic), compare sales for existing cytotoxics, including average peak sales

**Strengths**
- Can get actual sales data
- Minimal modeling; just use averages for line inputs

**Weaknesses**
- Power of the valuation is limited by how good the comp is
  - Is the product profile similar?
  - Is the environment when you launch in 4 years going to be the same?
    - Payers, competitors, generics
Comparables – Deal Valuation

Key question is what would a partner/acquirer pay based on “similar” deals?

**Strengths**

- Can get actual deal data, can get it for specific partners (terms, structure, trends)
- Minimal modeling; just target deals similar to your asset

**Weaknesses**

- Bias toward large deals: most deals don’t rise to material level for the large partner, or aren’t good enough so that the small partner wants to brag
- Most deals don’t show terms; of those that do:
  - Situations are different
  - Underlying products are different
  - Most terms are redacted or combined into “biobucks”
• **Approach:** Both use **cash flow** as their key metric
  – Cash flow is change in cash balance in a specified period of time
  – For any program past launch: \[ \text{CASH FLOW} = \text{Sales (cash generated)} - (\text{COGS} - \text{SG&A} - \text{taxes}) \text{ (cash used)} \]
  – Prior to launch, cash flow is a negative value unless out-license
  – Time period of cash flow must be identified

• **Key concept:** **Time Value of Money**
  – Money now is worth more than money later
  – Cash received later in time is “discounted” by the interest you could have received had you that cash to invest now
**Key Difference Between DCF and rNPV**

**DCF** uses discount rate to account for both development risk and cost of capital (e.g., 25% or 30% rate for early stage products).

**rNPV** uses stage probabilities of success for each stage of development, along with a cost of capital discount factor.

*Effectively multiplies cash flows by the probability of their occurrence*
Why Might rNPV Be a Superior Methodology in Licensing Over DCF?

- Distinguishes risky, novel programs from less risky reformulation programs by using stage probabilities
- Allows determination of explicit risk to next milestone; don’t see step up in value when get to the next phase
Real Options Analysis

• Similar to rNPV, but allows you to account for changes in conditions such that you can account for new decisions in the future

• Example: you assume $400M peak sales and estimate $80M of fixed sales and marketing costs to support those sales
  – Six years out, actual sales are only $70M; you would adjust those costs down or terminate the asset
Multiple approaches:
- Sunk cost
- Sum of parts
- Comparables
- Discounted Cash Flow (DCF)
- Risk-adjusted NPV (rNPV)
- Real options analysis

Which of these valuation methodologies are used most often in life sciences analytics?
Used Most Often Across Areas

All respondents
- valuation methods used:

- DCF: 62%
- rNPV: 64%
- RO: 13%
- Comp.: 58%
- Other: 17%

Source: BIOSTRAT Biotech Consulting
Which Methods Do Pharmas Use Most?
Used Most Often by Biotechs/Pharmas

![Bar chart showing primary valuation methods used by Biotech/Pharma Professionals.](chart)

Source: BIOSTRAT Biotech Consulting
Which Methods Do VCs Use Most?
Used Most Often by VCs

Venture Capital Investors - primary valuation method:

- DCF: 0%
- rNPV: 36%
- RO: 5%
- Comp.: 54%
- Other: 4.5%

Source: BIOSTRAT Biotech Consulting
Cash Flow is the **Best** Metric

- Change in cash balance in a specified period of time
- Most easily verifiable compared to an accounting term such as “net income”
- Cash is king
Driving to Cash Flow and NPV

Gross Sales \rightarrow Net Sales - Expenses = Pre-tax CF

- Less rebates, returns, discounts, samples
- Dev Costs
- Manufacturing Costs
- Marketing and Sales Costs
- Outgoing License Costs
## WW Product P&L - All Indications and Territories ($ mm)

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<td>659</td>
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<td>1,263</td>
<td>1,280</td>
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<td><strong>Discounts and Rebates</strong></td>
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<td>-</td>
<td>3</td>
<td>29</td>
<td>79</td>
<td>153</td>
<td>232</td>
<td>309</td>
<td>368</td>
<td>404</td>
<td>414</td>
<td>417</td>
<td>422</td>
<td>380</td>
<td>247</td>
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<tr>
<td><strong>Total Net Sales</strong></td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>24</td>
<td>209</td>
<td>577</td>
<td>1,119</td>
<td>1,703</td>
<td>2,268</td>
<td>2,699</td>
<td>2,964</td>
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<td>3,056</td>
<td>3,095</td>
<td>2,786</td>
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</table>

| **Expenses** |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
| Development Costs | 64    | 88    | 145   | 109   | 100   | 25    | 11    | -     | -     | -     | -     | -     | -     | -     | -     | -     | -     |
| Costs of Goods Sold | -     | -     | -     | -     | 2     | 19    | 50    | 94    | 141   | 186   | 221   | 242   | 248   | 249   | 252   | 227   | 148   |
| Sales and Marketing | -     | -     | -     | -     | 11    | 103   | 237   | 327   | 290   | 223   | 223   | 223   | 223   | 223   | 223   | 223   | 11    |
| Outgoing Milestones | 4     | -     | -     | -     | 6     | 9     | 8     | 6     | -     | -     | -     | -     | -     | -     | -     | -     | -     |
| Outgoing Royalties | -     | -     | -     | -     | 2     | 23    | 70    | 148   | 236   | 320   | 385   | 425   | 436   | 438   | 444   | 316   | -     |
| **Total Expenses** | 68    | 88    | 145   | 127   | 217   | 311   | 464   | 532   | 600   | 734   | 829   | 909   | 929   | 934   | 944   | 674   | 159   |

| **Pre-tax Cash Flow** | (68)  | (88)  | (145) | (127) | (193) | (102) | 113   | 587   | 1,104 | 1,534 | 1,870 | 2,054 | 2,108 | 2,122 | 2,150 | 2,111 | 1,652 |
Valuation Should Account for Strategic Fit

• Since fit is strategic for licensee, several factors can enhance the cash flow
  – Fits licensee’s clinical experience and relationships
    • Top quality investigators and advisors, optimal trial design
    • Quicker patient recruitment
    • May shorten overall length of trial
    • Preparation of NDA and probability of approval
  – Fits product portfolio and leverages marketing capabilities
    • Complements existing product, increases sales
    • Use existing sales force

*Pie and therefore deal terms should increase with the right strategic partner*
Program Cash Flow Example: Product Lifecycle

Product Lifecycle – Self-commercialize

Patent Expiry

Product NPV = $310M

Ph I  Ph II  Ph III  Filing

Launch

Cash Flow
$ M

1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19  20

-100 -50 0 50 100 150 200 250 300 350 400

Ph I  Ph II  Ph III  Filing

Launch

Patent Expiry

Product NPV = $310M

Cash Flow
$ M

1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19  20

-100 -50 0 50 100 150 200 250 300 350 400
Program Cash Flow Examples: Out-Licensed Product

Out-license at Phase II

Cash Flow $M

Milestones

Upfront

Royalties

NPV to Licensor = $100M
Program Cash Flow Examples: In-Licensed Product

In-license at Phase II

- Dev Costs + Milestones
- Commercialization Cash Flow less Royalties

NPV to Licensee = $210M
A company’s value in life sciences is determined in large part by these expected cash flows and by the degree of strategic combination and integration of its current and future programs.
Program Portfolio

1. Commercial stage

2. New product Yr 1

3. New product Yr 3

4. In-license Yr 2

5. Out-license, begin Yr 4
Company Cash Flow = Sum of Program Cash Flows
Cumulative Cash Flows = Cash Balances

Identifies Amount and Timing of Needed External Financing

Cumulative Cash Flow – Self-commercialization

$12M needed by year 2 (through Phase I)

$37M needed by year 4 (through Phase II)

$250M needed to finance project, including launch costs
Summary: Valuation Enhances Decision Making, Capital Raising, and Licensing

- **Aligning expectations**
  - Well-analyzed potential returns and timing

- **Clarity of purpose**
  - Why? For which programs?
  - How much is needed? When?

- **Greater specificity / detail**
  - Determine proper level of depth of analysis

- **Confidence / credibility**
  - But: analysis is only as good as its weakest part

*Clarity equals value*
Valuation Methodology: Three Fundamental Concepts

1. Expected value
2. Cost of capital
3. Present value

- These are distinct concepts
- Each is measured or determined independent of the other two
- Requires methodical application of the three concepts in combination to calculate the value of the program
Expected Value

- Weighted average of all possible values
- Independent of time
- Independent of cost of capital or discount rate
- Outcomes of events change expected value

\[ E[X] = x_1p_1 + x_2p_2 + x_3p_3 + \ldots + x_np_n \]

Where \( p_1 + p_2 + p_3 + \ldots + p_n = 1 \)
Events 1, 2 and 3 must be performed in that order. Cost to perform Event 1 is $15, cost for E2 is $25, cost for E3 is $40. If an event results in failure, then cannot proceed to next event. Success of E3 (and E1 and E2) is payout of $1000.

Result A

Value = $920
Four possible results, all under the exact same assumptions.

Result A: Value = $920
Result B: Value = -$15
Result C: Value = -$40
Result D: Value = -$80
Average the results? Averages of Results

Value = $196.25

Perhaps the results should be weighted to calculate a weighted average result?
Value = A \cdot p_a + B \cdot p_b + C \cdot p_c + D \cdot p_d

Which is the formula for Expected Value

\[ E[X] = x_1p_1 + x_2p_2 + x_3p_3 + \ldots + x_np_n \]

Where \[ p_1 + p_2 + p_3 + \ldots + p_n = 1 \]

Need to know or assume the probability of each possible result
**Result A**

Value = $920
Prob. = .5x.5x.5 = .125
Wgt Value = $115

**Result B**

Value = -$15
Prob. = .500
Wgt Value = -$7.5

**Result C**

Value = -$40
Prob. = .5x.5 = .250
Wgt Value = -$10

**Result D**

Value = -$80
Prob. = .5x.5x.5 = .125
Wgt Value = -$10

\[ p_a + p_b + p_c + p_d = 1 \]
Result A
Value = $920
Prob. = .5x.5x.5 = .125
Wgt Value = $115

Result B
Value = -$15
Prob. = .500
Wgt Value = -$7.5

Result C
Value = -$40
Prob. = .5x.5 = .250
Wgt Value = -$10

Result D
Value = -$80
Prob. = .5x.5x.5 = .125
Wgt Value = -$10

Expected Value = $115 + ($7.5) + ($10) + ($10) = $87.5
Additional Example: Decision Tree

Phase III

- Success: $p = 0.7$ (70% probability)
- Failure: $p = 0.3$ (30% probability)

Total: 100%
Additional Example: Decision Tree

Phase II
- Success: p = 0.4
- Failure: p = 0.6

Phase III
- Success: p = 0.7
- Failure: p = 0.3

Probability
- Success: 28%
- Failure: 12%
- Total: 100%
### Additional Example: Decision Tree

**Phase III**  
*(cost $40M)*

<table>
<thead>
<tr>
<th>Probability</th>
<th>Product Value Going Forward less Spent Cost</th>
<th>EV</th>
</tr>
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<tbody>
<tr>
<td>70%</td>
<td>$500M - $40M = $460M</td>
<td>320 (460 x 0.7)</td>
</tr>
<tr>
<td>30%</td>
<td>$0 - $40M = -$40M</td>
<td>-12 (-40 x 0.3)</td>
</tr>
</tbody>
</table>

**Given:**
- $40M cost of Ph III
- $500M forward rNPV upon successful Ph III
Additional Example: Decision Tree

**Phase II**
(\textit{cost $20M})

- **Success:** $500M - $60M = $440M
- **Failure:** $0 - $20M = -$20M

**Phase III**
(\textit{cost $40M})

- **Success:** $500M - $60M = $440M
  - Probability: 28%
  - EV: 123 (440 x 0.28)
- **Failure:** $0 - $60M = -$60M
  - Probability: 12%
  - EV: -7.2 (-60 x 0.12)
- **Failure:** $0 - $20M = -$20M
  - Probability: 60%
  - EV: -12 (-20 x 0.6)

**Total:** 100%

- Probability: 28%
- EV: 123 (440 x 0.28)
- Probability: 12%
- EV: -7.2 (-60 x 0.12)
- Probability: 60%
- EV: -12 (-20 x 0.6)
Step-up in Value Concept

<table>
<thead>
<tr>
<th>Forward rNPV ($ M)</th>
<th>Today</th>
<th>End of Ph II</th>
<th>End of Ph III</th>
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<tbody>
<tr>
<td>Probability to Launch</td>
<td>38%</td>
<td>63%</td>
<td>90%</td>
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<tr>
<td>Remaining Dev Cost</td>
<td>$105M</td>
<td>$85M</td>
<td>$5M</td>
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</table>
Product value increases as you:

• Resolve risk

• Have less remaining development cost
What other factor haven’t we discussed?
Key concept: $1 received today is worth more than $1 received in 5 years.

Why? Because you can invest that $1 received today and get a return.

This concept is applied in valuation as a cost of capital (discount rate).
How to Determine Cost of Capital?

- Minimum investors want for a project of equal risk – “hurdle rate”

- It depends on how funds are used, not their source

- Concept of “opportunity cost”: it’s the cost of debt and equity to compensate creditors and shareholders

- Changes with changes in investors’ views of market, of the industry and of the company
Determination of Cost of Capital

• **Sole proprietor**
  – Sole discretion: “I don’t waste my time and money on any project that doesn’t promise at least a 10% return”

• **Venture capitalists**
  – Their institutional investors provide funds *to them* seeking 20+% returns
  – VC requires 25+% returns on prospective investments (basically a 5x return over 7 years)

• **Capital markets**
  – Primarily public markets for stocks and bonds
  – Institutional debt placement
Discount Rate Has Major and Inverse Effect on Valuation

What rate should be used?

<table>
<thead>
<tr>
<th>Discount Rate</th>
<th>NPV ($M)</th>
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<tbody>
<tr>
<td>3.00%</td>
<td>$930</td>
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<tr>
<td>10.00%</td>
<td>$310</td>
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<tr>
<td>24.50%</td>
<td>$0</td>
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<tr>
<td>30.00%</td>
<td>($25)</td>
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**Internal Rate of Return (IRR)**

Discount rate that produces a break-even NPV. At rates less than IRR, the NPV is positive and the program is financially favorable. At rates greater than IRR, program is unfavorable.
Present Value

- Value at a given time of a single or series of payments or receipts at other times
- Dependent on time by definition
- Dependent on a discount rate

\[ NPV = \sum_{t=0}^{n} \frac{CF_t}{(1 + R)^t} \]
Present Value Today of $1 Received in 5 Years

- 3% discount rate: $0.86 today
- 10% discount rate: $0.62 today
- 25% discount rate: $0.33 today
As discount rate increases, value today of money received the future decreases.

So higher discount rates mean lower asset value and lower deal terms.
So How Does This All Tie to Licensing?

- Think of total product value (based on risk-adjusted net present value of cash flows) as a pie

- Pie gets split between the licensor and the licensee in the form of deal terms
## Expected Cash Flows Reflect Licensing Terms

### Cash Flows to Licensor and Licensee

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<th>Year</th>
<th>Cash Flow to Licensor</th>
<th>Cash Flow to Licensee</th>
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<tr>
<td>0</td>
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<tr>
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<tr>
<td>16</td>
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### Key Values
- **$50M Upfront**
- **$75M Milestone**
- **20% Royalties**
As a product moves forward in development, share to licensor increases.

Why? For a variety of reasons, but primarily because of scarcity—there are a lot fewer available Phase III assets.
There’s a Range in this Split – Why?

• Concept of “Strength of Negotiating Position”

• Factors include:
  • Interest level / number of bidders
  • Atypical relative contributions of licensee vs. licensor
  • Relative knowledge of market conditions
  • Relative strength of negotiating skills
  • Financial strength / distress of either party
Key implication: product value increases substantially from a successful trial…

Product Value Given Success ($M)

- **Today**: 200
- **End of Ph II**: 400
- **End of Ph III**: 600

- Product value increases by 50%
- Product value doubles
... But value to licensor increases by even more

![Graph showing product value given success with value to licensor almost triples and value to licensee increasing significantly.](image-url)
Application: License Now or Wait?

Value to Licensor of Expected Deal Terms (NPV $ M)

License Now

- **$40M**

Wait

- **$60M**

Phase II Success

- **140**

P=50%

Phase II Fail

- **0**

P=50%

Assuming you can raise money on favorable terms*, licensor should consider waiting to license until after Phase II.

$70M less $10M cost of trial = $60M

*Analysis doesn’t yet include dilution or discounting on future deal
Summary

- Valuation methodologies
- Valuation concepts
- Link between valuation and deal terms (splitting the pie)
- Think Win-Win
Valuation Methodology: A Powerful Tool

- Evaluating and negotiating licensing deals
- Assessing value of programs
  - Selecting and prioritizing
  - Budgeting and monitoring
- Financing and investor relations
- M&A
FINANCE CONCEPTS IN LICENSING

Valuation Methodology

John Selig, Woodside Capital Partners
john.selig@woodsidecap.com

Building a Business Development Model

Neel Patel, Campbell Alliance
npatel@campbellalliance.com
The next section of today’s discussion will be to arm you with knowledge about the key data sources to use when building valuation models and to alert you to common mistakes that can occur along the way.
We will first provide you with the details of a hypothetical product that will help guide today’s discussion.
As we think about the key inputs to building a valuation model and the data sources used to generate those inputs, it will be helpful to reference a hypothetical product.

- Our hypothetical product, “Zaxxon,” is a molecule currently in development for moderate to severe Crohn’s disease.
- It has the potential to be a very effective medication, but it comes with some side effects that we can assume will relegate it to always be a later-line therapy.
- We expect this product to enter phase III trials in October 2012.
- For the sake of simplicity we will imagine that we are only interested in the potential value of this product in the US.
- The drug is expected to be prescribed almost exclusively by specialists (gastroenterologists).
- Patent expiration for Zaxxon is expected to occur in early 2024.
Our initial estimates for Zaxxon show a peak-year revenue of almost $200 million and a net present value of $65 million. We will now take time to understand some of the data sources that can go into such estimates.

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<td>Revenue</td>
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<td>Discounted Cash Flow (12%)</td>
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<td>(28.0)</td>
<td>(11.9)</td>
<td>(22.0)</td>
<td>(3.9)</td>
<td>9.8</td>
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<td>Total NPV</td>
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Building a valuation model requires you to make assumptions for a number of different forecast drivers.
Model inputs can be divided into three segments: revenue, cost, and other, which account for inputs that are neither revenue nor cost drivers.
When developing valuation models, it is important to remember that the forecast estimate is only as good as the assumptions that go into it. Significant time must be invested in identifying appropriate data sources that can support valid forecast assumptions.

<table>
<thead>
<tr>
<th>Revenue Inputs</th>
<th>Cost Inputs</th>
<th>Other Inputs</th>
</tr>
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<tbody>
<tr>
<td>• Patient flow</td>
<td>• Development</td>
<td>• Discount rate</td>
</tr>
<tr>
<td>• Product adoption</td>
<td>• Sales force</td>
<td>• Tax rate</td>
</tr>
<tr>
<td>• Price of therapy</td>
<td>• Pre-launch marketing</td>
<td>• Development risk</td>
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<tr>
<td>• Reimbursement</td>
<td>• Post-launch marketing</td>
<td>• Launch timing</td>
</tr>
<tr>
<td>• Payer access</td>
<td>• Costs of goods sold</td>
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<tr>
<td>• Length of therapy</td>
<td>• Rebates/discounts</td>
<td></td>
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<tr>
<td>• Number of episodes per year</td>
<td>• NDA application</td>
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<td></td>
<td>• Milestone payments</td>
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</table>
Our remaining time will be focused on reviewing several key model inputs.
Due to our limited time we have focused our discussion on a few important inputs that go into a valuation model. For each, we will provide an overview, highlight mistakes commonly made with the assumption, and share helpful data sources.
We will first explore three key drivers of a revenue forecast. The first component we will discuss is patient flow.

![Image of Revenue Drivers: Patient Flow, Adoption, Pricing]
A starting point for understanding the patient flow is often the US census population data. From there, we then segment the relevant patient population based on primary and secondary research.

<table>
<thead>
<tr>
<th>Population</th>
<th>Prevalence Rate</th>
<th>Segmentation by Disease Severity</th>
<th>Diagnosed and Treated Rate</th>
<th>Segmentation by Line of Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population in US</td>
<td>Crohn’s Prevalence (.17%)</td>
<td>Moderate to Severe Crohn’s Population (60%)</td>
<td>Diagnosed and Treated Moderate to Severe Crohn’s Population (90%)</td>
<td>Moderate to Severe Crohn’s Prevalence Not on 1st-Line Therapy (80%)</td>
</tr>
<tr>
<td>300M</td>
<td>520K</td>
<td>312K</td>
<td>281K</td>
<td>225K</td>
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</tbody>
</table>
Using potentially biased sources and not pinpointing the appropriate patient population can overestimate Zaxxon’s product valuation.

<table>
<thead>
<tr>
<th>Patient Flow Component</th>
<th>Common Mistake</th>
<th>Instead You Should…</th>
</tr>
</thead>
</table>
| Prevalence                             | Using only figures cited in the press, by patient advocacy groups, or industry participants | ▪ Combine prevalence estimates from a number of sources.  
▪ Consider the potential incentives and biases of particular sources.  
▪ Segment the patient universe according to Zaxxon’s product profile. |
| Segmentation by Disease Severity       | Including patients whose disease severity does not match Zaxxon’s profile      |                                                                                    |
| Diagnosed and Treated Rate             | Including all patients with a condition, not just those whose condition warrants treatment by a physician |                                                                                    |
| Segmentation by Line of Therapy        | Including patients whose treatment status does not match Zaxxon’s profile      |                                                                                    |
There are a number of sources that can be consulted when constructing a patient flow. Ideally, each assumption will be verified through multiple sources.

### Secondary Research

<table>
<thead>
<tr>
<th>Free and Publicly Available (Easy-to-use, but be mindful of source quality)</th>
<th>Syndicated Data (One-time purchases or subscriptions)</th>
<th>Data Service Companies (High quality but potentially expensive)</th>
<th>Primary Research With Appropriate Stakeholders</th>
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</thead>
<tbody>
<tr>
<td>• National Institute of Health website (<a href="#">prevalence</a>)</td>
<td>Many may cover some or all dimensions of the patient flow. It is important here to check the source behind the source and to cross-reference inputs across multiple sources.</td>
<td>Script data for competitive products can help you refine and validate all dimensions of the patient flow.</td>
<td>Primary research with physicians should be used to validate findings from secondary sources when possible.</td>
</tr>
<tr>
<td>• World Health Organization website (<a href="#">prevalence</a>)</td>
<td>• Datamonitor</td>
<td>• IMS</td>
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<tr>
<td>• Journal articles (<a href="#">prevalence, segmentation, diagnosed and treated rate</a>)</td>
<td>• Business Insights</td>
<td>• Wolters Kluwer</td>
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<tr>
<td>• Patient advocacy websites (<a href="#">prevalence</a>)</td>
<td>• Decision Resources</td>
<td>• Verispan</td>
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</tr>
<tr>
<td>• SEC filings and press releases of competitors (<a href="#">prevalence</a>)</td>
<td>• Analyst reports</td>
<td>• Timely Data Resources</td>
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<tr>
<td>• NHANES (CDC) (<a href="#">prevalence</a>)</td>
<td>• DaVinci (oncology)</td>
<td>•</td>
<td></td>
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<tr>
<td>• SEER database (NIH) (<a href="#">oncology prevalence</a>)</td>
<td>• Some journal articles</td>
<td>•</td>
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<tr>
<td>• National Hospital Discharge Survey (CDC) (<a href="#">prevalence</a>)</td>
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<td>• US Renal Data System (ESRD)</td>
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<tr>
<td>• International Agency for Research on Cancer (<a href="#">international cancer prevalence</a>)</td>
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</table>
We will next discuss key data sources for estimating product adoption for Zaxxon.

![Revenue Drivers Diagram]

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<tr>
<td>Total NPV</td>
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</table>

Total NPV: $65.4$
After identifying the total potential patient population, we need to estimate the number of patients for whom physicians will prescribe Zaxxon.
We must also assume an uptake curve for the adoption of Zaxxon. In this example we assume a five-year sigmoid curve.

Such an “S-shaped” curve is commonly used to forecast drug uptake. It is characterized by slow initial adoption, rapid uptake in subsequent years, and a tailing off as the product nears peak penetration. It is commonly assumed that it takes a product five years after launch to get to peak penetration.

Important to remember is that when valuing pharmaceuticals, you must account for the loss of patent protection.
Even with primary market research with prescribing physicians, there are a number of common mistakes that can dramatically alter product valuation.

<table>
<thead>
<tr>
<th>Common Mistake</th>
<th>Instead You Should…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ignoring compliance</td>
<td>Do not forget to account for lost patients. A percentage of patients will experience insufficient efficacy and/or troublesome side effects with Zaxxon just as they do with other therapies.</td>
</tr>
<tr>
<td>Using an unrealistic product profile in market research</td>
<td>Share with physicians a target profile based on Zaxxon’s clinical data. Overestimating or underestimating Zaxxon’s efficacy, safety, and/or convenience can result in a misrepresentation of the drug’s value.</td>
</tr>
<tr>
<td>Not considering future competitors when assessing the future market for Zaxxon</td>
<td>When forecasting the future market for Zaxxon, remember to account for future entrants. In physician market research ask physicians about their potential use of Zaxxon in light of current and future competitors.</td>
</tr>
<tr>
<td>Unrealistic product adoption timeline</td>
<td>Base Zaxxon’s uptake curve on the unmet need and competitive environment of the market you are forecasting.</td>
</tr>
</tbody>
</table>
Estimates for the adoption rate should be grounded in primary market research with prescribing physicians but can be validated through secondary research.

### Secondary Research

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| • SEC filings and press releases of competitors may provide historical and current sales of competitive products  
• If primary research is not feasible, an assessment of the competitive landscape and a comparison of competitive products against Zaxxon can be a starting point to estimating an adoption rate for Zaxxon  
• Some analyst reports  
• FDA Orange Book [patent life] | Analyst and industry reports can lay out the current competitive environment for Crohn’s disease, which can help you profile competitive products along with Zaxxon in your primary market research. Sources include:  
• Datamonitor  
• Decision Resources  
• BCC Healthcare  
• Arrowhead Publishers  
• Visiongain Intelligence  
• Business Insights  
• Life Science Analytics  
• Med Ad News | Data companies, including Wolters Klower and IMS, can provide historical sales trends on analog products that could enable you to construct adoption curves specific to Zaxxon. | Estimates for an adoption rate for Zaxxon should be generated through market research with appropriate physicians. Sharing Zaxxon’s product profile with physicians can give an early sense for their likely adoption once Zaxxon is launched. |
The final step in determining revenue is to estimate the cost of therapy and adjust for any potential payer restrictions.

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<td>0.2</td>
</tr>
<tr>
<td>Total NPV</td>
<td>65.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
When a product is not internal to your company, you may have to estimate the price using the costs of analog therapies as a proxy.
We need to know the price of a drug if we are to estimate its revenue. Be aware that “price” is a simple word with multiple meanings. Price may be expressed in terms of average wholesale price (AWP; “list”), wholesale acquisition cost (WAC; “wholesale”), and Average Selling Price (ASP; “net”).

**High-Level Pricing Definitions**

- **List Price**
  - What Wholesalers Pay
  - 100%
  - AWP

- **WAC, ~80%**
  - What wholesalers pay

- **Discount, ~20%**

- **Rebate, ~15%**

- **ASP, ~75%**
  - What Payers Pay

Wholesaler discounts are typically in the range of 15% to 20% (20% shown).

Payers may receive substantial rebates (10%-20% in competitive markets).

**Manufacturers Net ASP**

- **Rebate**

- **Discount**

- **ASP = AWP – Discounts – Rebates**

We need to know ASP for the financial models. CMS ([https://www.cms.gov/McrPartBDrugAvgSalesPrice/](https://www.cms.gov/McrPartBDrugAvgSalesPrice/)) now publishes ASP for drugs sold in the US.
Using inappropriate product analogs, ignoring price rebates, and not taking into account the influence of generics are all common mistakes in estimating price.

<table>
<thead>
<tr>
<th>Common Mistake</th>
<th>Instead You Should…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using the wrong analogs</td>
<td>Make sure you identify appropriate analogs based on similar efficacy, safety, and method of administration.</td>
</tr>
<tr>
<td>Ignoring rebates</td>
<td>Account for potential rebates in the sales price of your drug.</td>
</tr>
<tr>
<td>Not paying attention to the generic status of competitive products</td>
<td>Research the remaining patent life of competitive products. If one or more products go generic during your forecast period, it could have a dramatic impact on your pricing power.</td>
</tr>
</tbody>
</table>
There are a number of potential sources to use to identify potential analog products for pricing and to find the prices for those analog products.

<table>
<thead>
<tr>
<th>Secondary Research</th>
<th>Syndicated Data (One time purchases or subscriptions)</th>
<th>Data Service Companies (High quality but potentially expensive)</th>
<th>Primary Research with Appropriate Stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Free and Publicly Available (Easy to use but be mindful of source quality)</strong></td>
<td><strong>Medi-Span – Price Rx®</strong></td>
<td><strong>Wolters Kluwer – Can provide current and historic pricing information by product</strong></td>
<td></td>
</tr>
<tr>
<td>• Mail order prescription websites</td>
<td>• First Databank – Pricepoint Rx™</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Center for Medicare and Medicaid Services (CMS) – ASP Database</td>
<td>• Red Book</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Epocrates.com (formulary data)</td>
<td>• Medi-Span (formulary data)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Syndicated publishers with pricing focused materials:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Decision Resources</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Cutting Edge Information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Visiongain Intelligence</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Based on the Dealmakers’ Intention Survey, pricing analysis in addition to physician analysis is becoming more of the norm when evaluating in-licensing opportunities.

Source: Campbell Alliance Dealmakers’ Intentions Survey 2011.
Example of a bad revenue analysis from a Wall Street Analyst

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(All figures in thousands except prices)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Patients eligible for treatment</td>
<td>3000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Diagnosed and treated</td>
<td>20%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Patients actually treated</td>
<td>600</td>
<td>654</td>
<td>713</td>
<td>777</td>
<td>847</td>
<td>923</td>
<td>1,006</td>
<td>1,097</td>
<td>1,196</td>
<td>1,303</td>
<td>1,420</td>
</tr>
<tr>
<td>Growth %</td>
<td>9%</td>
<td>9%</td>
<td>9%</td>
<td>9%</td>
<td>9%</td>
<td>9%</td>
<td>9%</td>
<td>9%</td>
<td>9%</td>
<td>9%</td>
<td>9%</td>
</tr>
<tr>
<td>% Market Share</td>
<td>0%</td>
<td>3%</td>
<td>6%</td>
<td>9%</td>
<td>12%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
</tr>
<tr>
<td># Patients treated</td>
<td>2</td>
<td>21</td>
<td>47</td>
<td>76</td>
<td>111</td>
<td>151</td>
<td>165</td>
<td>179</td>
<td>195</td>
<td>213</td>
<td></td>
</tr>
<tr>
<td>Cost per treatment (6 months)</td>
<td>$2,887</td>
<td>$2,974</td>
<td>$3,063</td>
<td>$3,155</td>
<td>$3,250</td>
<td>$3,347</td>
<td>$3,447</td>
<td>$3,551</td>
<td>$3,657</td>
<td>$3,767</td>
<td></td>
</tr>
<tr>
<td>Price Increase</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Total U.S. products sales</td>
<td>$5,774</td>
<td>$63,601</td>
<td>$142,800</td>
<td>$240,491</td>
<td>$360,038</td>
<td>$505,193</td>
<td>$567,113</td>
<td>$636,803</td>
<td>$714,835</td>
<td>$802,607</td>
<td></td>
</tr>
<tr>
<td>Growth YoY</td>
<td>1002%</td>
<td>125%</td>
<td>68%</td>
<td>50%</td>
<td>40%</td>
<td>12%</td>
<td>12%</td>
<td>12%</td>
<td>12%</td>
<td>12%</td>
<td></td>
</tr>
</tbody>
</table>
We will now discuss two important cost drivers: sales force costs and development cost (and risk). We will first discuss development costs and risks.
There is no substitute for a detailed, line-by-line forecast of clinical trial costs. However, when we lack a detailed forecast, we can use an estimation approach to forecast development costs.

1. **Clinical Trial Costs**
   - Average Cost per Patient
   - Number of Patients Studied
   - Phase I Costs
   - Phase II Costs
   - Phase III Costs

2. **Regulatory Costs**
   - NDA Prep Work
   - Filing Costs
     - US
     - EU
     - Japan

3. **Timeline and Risk of Failure at Each Stage of Development**
To estimate clinical costs, it is important to consider the therapeutic area of interest, the number of trials necessary, and the anticipated length of each trial.

Clinical success is by no means a sure thing. Forecasting clinical development costs must also account for trial timeline and risk of failure.

### Stages of Development

<table>
<thead>
<tr>
<th>Stage</th>
<th>Average Transition Probability (%)</th>
</tr>
</thead>
</table>

Not properly accounting for development costs and risks can dramatically affect your valuation model as these occur in the early years of the forecast where valuation is most sensitive.

<table>
<thead>
<tr>
<th>Common Mistake</th>
<th>Instead You Should…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failing to account for development risk</td>
<td>In your model you need to account for the scenario where the drug fails overall, eliminating all subsequent cash inflows and outflows.</td>
</tr>
<tr>
<td>Not accounting for potential trial failures, especially in areas with high placebo response rates</td>
<td>Failed trials still cost money. Account for the possibility that your drug may need additional trials to account for failures by examining the trial history of competitive products.</td>
</tr>
<tr>
<td>Using unrealistic development timelines</td>
<td>The timing of cash flows is important in a valuation model, particularly in the early years. Be sure to assume a reasonable timeline, including for regulatory approval, when building a valuation model.</td>
</tr>
</tbody>
</table>
There are several sources that may be used to help estimate development costs.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Free and Publicly Available (Easy to use but be mindful of source quality)</th>
<th>Syndicated Data (One time purchases or subscriptions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimating average cost per patient</td>
<td>- Internal company data</td>
<td>- Paraxel's Pharmaceutical R&amp;D Statistical Sourcebook (provides data by phase and by therapeutic class)</td>
</tr>
</tbody>
</table>
| Estimating number of patients in trials | - Internal company data  
- NIH  
- FDA Center for Drug Evaluation and Research  
- ClinicalStudyResults.org  
- ClinicalTrials.gov | - Frost & Sullivan  
- Datamonitor  
- Kalorama Information  
- Business Insights  
- Center Watch |
| Estimating development risk    | - Internal company data  
- NIH  
- FDA Center for Drug Evaluation and Research |                                                                                                                                                  |
The more customized to your situation the better, but below are some general industry data that you may consider using in the absence of anything else.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Secondary Research</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Free and Publicly Available (Easy-to-use but be mindful of source quality)</td>
</tr>
<tr>
<td>Estimating average cost per patient</td>
<td>▪ Internal company data</td>
</tr>
<tr>
<td></td>
<td>▪ Paraxel's Pharmaceutical R&amp;D Statistical Sourcebook (provides data by phase and by therapeutic class)</td>
</tr>
<tr>
<td>Estimating number of patients in trials</td>
<td>▪ Internal company data, NIH, FDA Center for Drug Evaluation and Research, Clinicalstudyresults.org, Clinicaltrials.gov</td>
</tr>
<tr>
<td></td>
<td>▪ Statistical Sourcebook (provides data by phase and by therapeutic class)</td>
</tr>
<tr>
<td></td>
<td>▪ Frost &amp; Sullivan</td>
</tr>
<tr>
<td></td>
<td>▪ Datamonitor</td>
</tr>
<tr>
<td></td>
<td>▪ Kalorama Information</td>
</tr>
<tr>
<td></td>
<td>▪ Business Insights</td>
</tr>
<tr>
<td></td>
<td>▪ Center Watch</td>
</tr>
<tr>
<td>Estimating development risk</td>
<td>▪ Internal company data, NIH, FDA Center for Drug Evaluation and Research</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

According to the NIH and FDA (as cited on the Mayo Clinic website), the following are estimates for trial sizes:
P1 = 20-80
P2 = 100-300
P3 = 1000-3000
The final cost driver we will discuss is sales and marketing costs.

### Cost Drivers

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.6</td>
<td>15.6</td>
<td>55.1</td>
<td>109.3</td>
<td>159.5</td>
<td>188.9</td>
<td>199.5</td>
<td>154.6</td>
<td>25.5</td>
<td>0.4</td>
</tr>
<tr>
<td>Sales Costs</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>8.9</td>
<td>9.4</td>
<td>9.8</td>
<td>10.3</td>
<td>10.9</td>
<td>11.4</td>
<td>12.0</td>
<td>12.6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Marketing Costs</td>
<td>4.6</td>
<td>5.7</td>
<td>9.8</td>
<td>20.5</td>
<td>10.8</td>
<td>11.9</td>
<td>13.0</td>
<td>14.3</td>
<td>15.8</td>
<td>17.4</td>
<td>19.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cost of Goods Sold</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.1</td>
<td>1.6</td>
<td>5.5</td>
<td>10.9</td>
<td>16.0</td>
<td>18.9</td>
<td>19.9</td>
<td>15.5</td>
<td>2.5</td>
<td>-</td>
</tr>
<tr>
<td>Development Costs</td>
<td>25.7</td>
<td>25.7</td>
<td>5.1</td>
<td>2.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Estimated Pre-Tax Cash Flow</td>
<td>(30.3)</td>
<td>(31.4)</td>
<td>(14.9)</td>
<td>(30.9)</td>
<td>(6.2)</td>
<td>27.9</td>
<td>75.1</td>
<td>118.3</td>
<td>142.8</td>
<td>150.2</td>
<td>107.4</td>
<td>23.0</td>
<td>0.4</td>
</tr>
<tr>
<td>Estimated Tax</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>10.6</td>
<td>28.5</td>
<td>45.0</td>
<td>54.3</td>
<td>57.1</td>
<td>40.8</td>
<td>8.7</td>
<td>0.2</td>
<td>-</td>
</tr>
<tr>
<td>Estimated After-Tax Cash Flow</td>
<td>(30.3)</td>
<td>(31.4)</td>
<td>(14.9)</td>
<td>(30.9)</td>
<td>(6.2)</td>
<td>17.3</td>
<td>46.6</td>
<td>73.3</td>
<td>88.5</td>
<td>93.1</td>
<td>66.6</td>
<td>14.3</td>
<td>0.2</td>
</tr>
<tr>
<td>Total NPV</td>
<td>65.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total NPV: 65.4
It is important to first understand the concept of “deciling.” In sales force forecasts, a prescribing universe is often broken down into deciles based on prescribing levels.

### Top Prescribers of CNS Market

<table>
<thead>
<tr>
<th>Market Decile</th>
<th>Number of Prescribers</th>
<th>Cum. # of Prescribers</th>
<th>Cum. % of Prescribers</th>
<th>Cum. % of TRx</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>3,517</td>
<td>3,517</td>
<td>0.5%</td>
<td>10.0%</td>
</tr>
<tr>
<td>9</td>
<td>6,437</td>
<td>9,954</td>
<td>1.5%</td>
<td>20.0%</td>
</tr>
<tr>
<td>8</td>
<td>8,890</td>
<td>18,844</td>
<td>2.9%</td>
<td>30.0%</td>
</tr>
<tr>
<td>7</td>
<td>11,245</td>
<td>30,089</td>
<td>4.7%</td>
<td>40.0%</td>
</tr>
<tr>
<td>6</td>
<td>13,864</td>
<td>43,953</td>
<td>6.8%</td>
<td>50.0%</td>
</tr>
<tr>
<td>5</td>
<td>17,141</td>
<td>61,094</td>
<td>9.5%</td>
<td>60.0%</td>
</tr>
<tr>
<td>4</td>
<td>21,863</td>
<td>82,957</td>
<td>12.8%</td>
<td>70.0%</td>
</tr>
<tr>
<td>3</td>
<td>30,136</td>
<td>113,093</td>
<td>17.5%</td>
<td>80.0%</td>
</tr>
<tr>
<td>2</td>
<td>50,445</td>
<td>163,538</td>
<td>25.3%</td>
<td>90.0%</td>
</tr>
<tr>
<td>1</td>
<td>482,539</td>
<td>646,077</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

### Composition of Top Prescribers

<table>
<thead>
<tr>
<th>Market Decile</th>
<th>Number of Prescribers</th>
<th>Psych</th>
<th>PCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>3,517</td>
<td>2,845</td>
<td>425</td>
</tr>
<tr>
<td>9</td>
<td>6,437</td>
<td>2,992</td>
<td>2,879</td>
</tr>
<tr>
<td>8</td>
<td>8,890</td>
<td>2,321</td>
<td>5,705</td>
</tr>
<tr>
<td>7</td>
<td>11,245</td>
<td>2,051</td>
<td>7,920</td>
</tr>
<tr>
<td>6</td>
<td>13,864</td>
<td>2,011</td>
<td>9,983</td>
</tr>
<tr>
<td>5</td>
<td>17,141</td>
<td>2,129</td>
<td>12,152</td>
</tr>
<tr>
<td>4</td>
<td>21,863</td>
<td>2,626</td>
<td>14,493</td>
</tr>
<tr>
<td>Total</td>
<td>82,957</td>
<td>16,975</td>
<td>53,557</td>
</tr>
</tbody>
</table>
A “reach and frequency” model can be used to estimate sales force costs.

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Details per Day</td>
<td>7</td>
</tr>
<tr>
<td>Selling Days per Year</td>
<td>211</td>
</tr>
<tr>
<td>Details per Year per Rep</td>
<td>1,477</td>
</tr>
<tr>
<td>Cost per Year per Rep</td>
<td>$150K</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Audience</th>
<th>US Gastroenterologists</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Specialists</td>
<td>11,864</td>
<td>11,864</td>
</tr>
<tr>
<td>Frequency of Details</td>
<td>15 for deciles 9-10; 10 for deciles 6-8</td>
<td></td>
</tr>
<tr>
<td>Total Details</td>
<td>71,184</td>
<td>71,184</td>
</tr>
<tr>
<td>Share of Cost to Product</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Required Reps</td>
<td>49</td>
<td>49</td>
</tr>
<tr>
<td>Total Detailing Cost</td>
<td>$7.35M</td>
<td>$7.35M</td>
</tr>
</tbody>
</table>

Determined the typical fully-loaded field-force costs by market (and/or specialty) based on industry benchmarks

Determined number of relevant specialists by market to be targeted for Zaxxon

Determined the reach (i.e., *How many deciles to target?*) and frequency (i.e., *How often to target these deciles?*) based on internal company decisions

Allocated share of detail to Zaxxon (based on expected positioning within detail call)

Calculated the number of required reps and total detailing costs for Zaxxon
There are a number of common mistakes that can be made across the different variables that go into a “reach and frequency” model.

<table>
<thead>
<tr>
<th>Common Mistake</th>
<th>Instead You Should…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not allocating the sales force costs across multiple products</td>
<td>If the sales force will be detailing multiple products to the same physicians, the sales force cost should be split accordingly.</td>
</tr>
<tr>
<td>Not using fully-loaded costs to estimate the cost of a salesperson</td>
<td>In addition to base salary and bonus, you must account for benefits. A rule of thumb is 2x salary and bonus to arrive at a “fully-loaded” cost.</td>
</tr>
<tr>
<td>Accounting for all physicians within a prescribing universe when forecasting sales costs</td>
<td>Typical sales efforts focus only on the top few prescribing deciles to get the highest return on investment. Include only those target physicians who are believed to be sales targets.</td>
</tr>
</tbody>
</table>
There are several sources that can be consulted when building a “reach and frequency” model to estimate sales force costs.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Secondary Research</th>
<th>Primary Research with Appropriate Stakeholders</th>
</tr>
</thead>
</table>
| Determining fully-loaded field-force costs  | ▪ Internet research (salary.com)  
▪ $150K-$250K is often used as fully-loaded cost | Potentially validate data through primary research |
| Determining number of relevant specialists to be targeted | ▪ AMA website  
▪ OECD website (provides European data) |  |
| Determine reach and frequency               | ▪ Internal assumption  
▪ Cutting Edge Information  
▪ Verispan can provide data on sales force size | Potentially validate data through primary research |
| Allocate share of detail to Zaxxon          | ▪ Internal assumption |  |
Example of a bad NPV analysis from a Wall Street Analyst

### NPV Model

*All figures in thousands (except per share figures)*

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Product sales</td>
<td>$5,774</td>
<td>$63,601</td>
<td>$142,800</td>
<td>$240,491</td>
<td>$360,038</td>
<td>$505,193</td>
<td>$567,113</td>
<td>$636,803</td>
<td>$714,835</td>
<td>$802,607</td>
</tr>
<tr>
<td>Operating expenses (75% of sales)</td>
<td>$4,331</td>
<td>$47,701</td>
<td>$107,100</td>
<td>$180,368</td>
<td>$270,029</td>
<td>$378,895</td>
<td>$425,334</td>
<td>$477,602</td>
<td>$536,126</td>
<td>$601,955</td>
</tr>
<tr>
<td>Net income (25% profit margin)</td>
<td>$1,444</td>
<td>$15,900</td>
<td>$35,700</td>
<td>$60,123</td>
<td>$90,010</td>
<td>$126,298</td>
<td>$141,778</td>
<td>$159,201</td>
<td>$178,709</td>
<td>$200,652</td>
</tr>
<tr>
<td>Net income*Likelihood of Success (80%) = E</td>
<td>$1,155</td>
<td>$12,720</td>
<td>$28,560</td>
<td>$48,098</td>
<td>$72,008</td>
<td>$101,039</td>
<td>$113,423</td>
<td>$127,361</td>
<td>$142,967</td>
<td>$160,521</td>
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<tr>
<td>NPV of EAT</td>
<td>$377,536</td>
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<tr>
<td>Cash by 2Q13E</td>
<td>$26,000</td>
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<tr>
<td>Total NPV</td>
<td>$403,536</td>
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<tr>
<td>NPV/Share</td>
<td>$4.50</td>
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</table>
Modeling Best Practices

As we close today’s presentation, there are a few important modeling best practices to discuss.

Managerial Recommendations

- Make sure you understand the market environment.
- Don’t overcomplicate the risk assessment (more on this on the next page).
- Compare the results of your model with current products and recent deals.

Modeling Recommendations

- Use a standardized model template—starting from a blank spreadsheet for each new model is time-consuming and increases the potential for calculation errors.
- Use range names for input variables—avoid hard coding values in formulas.
- Use standardized formatting conventions that clearly differentiate user input from model calculations.
- When transferring model outputs to PowerPoint presentations, use the “Paste Special” utility—otherwise, your entire model will be embedded in the PowerPoint document.
- Create a page in your model to provide references for important inputs.