Pipeline Strategy

David Ridley

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Agenda

- Which 2 candidates and why?
- What about the other 2?
- How is Vertex today?
- What are the FDA designations?
- Conclusions, news, and next

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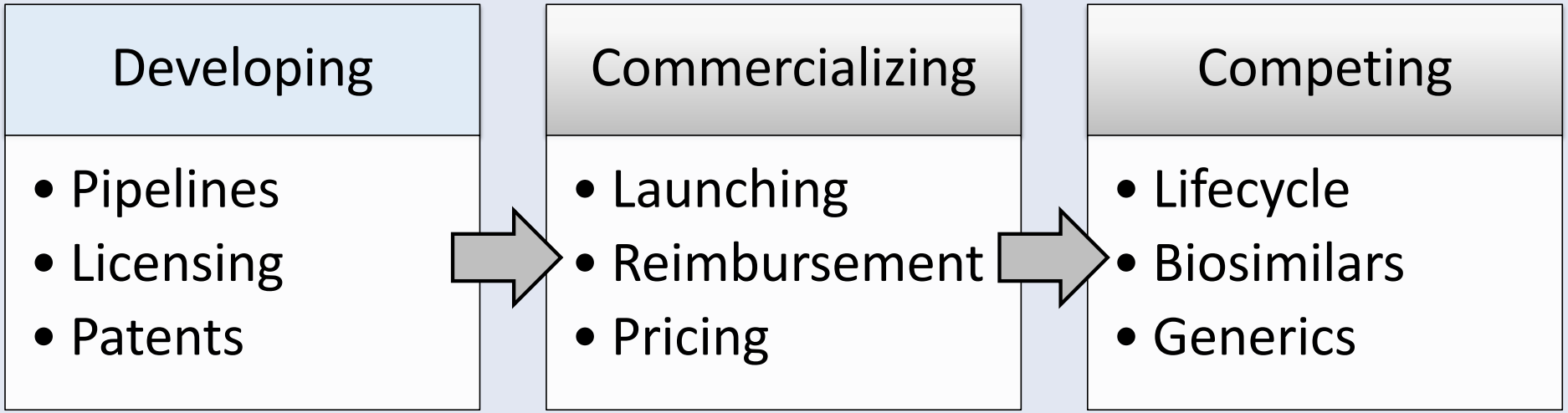
Developing
• Pipelines
• Licensing
• Patents
Commercializing
• Launching
• Reimbursement
• Pricing
Competing
• Lifecycle
• Biosimilars
• Generics

		VX-148	VX-702
		Psoriasis	Acute Coronary Syndrome
Demand	+		
	-		
Supply	+		
	-		

		VX-765	VX-950
		Rheumatoid Arthritis, Osteoarthritis	Hepatitis C
Demand	+		
	-		
Supply	+		
	-		

What should Vertex do with the others?

- **Hold**
- **License**

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Probability $\geq$ 1 approval

= 1 – probability that none

If flip a coin twice, probability ≥1 heads?

- 0.5*0.5 = 0.25 = probability both tails
- 1-0.25 = 0.75 = prob. that not both tails = prob. ≥1 head
- Answer: 75%
- Check: HH, HT, TH, TT

	Phase I	Phase II	Phase III	Approval	Succeed	Fail
VX-148 (Psoriasis)	100%	40%	65%	75%	20%	81%
VX-702 (ACS)	100%	60%	50%	50%	15%	85%
VX-765 (Arth)	80%	60%	60%	75%	22%	78%
VX-950 (HCV)	70%	50%	75%	80%	21%	79%

If 2	Prob 148 and 702 fail		68%
	Prob either 148 or 702	32%	
	Prob 765 and 950 fail		62%
	Prob either 765 or 950	38%	
If 4	Prob all fail		42%
	Prob one succeeds	58%	

What should Vertex do with the others?

- **Hold**
- Have something
  - Product in pipeline for investors
  - Option value

- **License**
- Time
  - Patent clock ticking
  - Competitors passing
  - $1 now better than $1 later

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		VX-148
	Disease	Psoriasis
Demand	Prevalence (US)	2.7 million
	Competition	Competitive
Supply	Marketing	
	Science	Validated target
	Partners	
	Remaining cost	$100m
	Time of case stage	Phase 2
	Prob. approved (Vertex)	.20
	Prob. approved (Tufts)	.26
	Vertex decision	**X Inactive, because too easy**

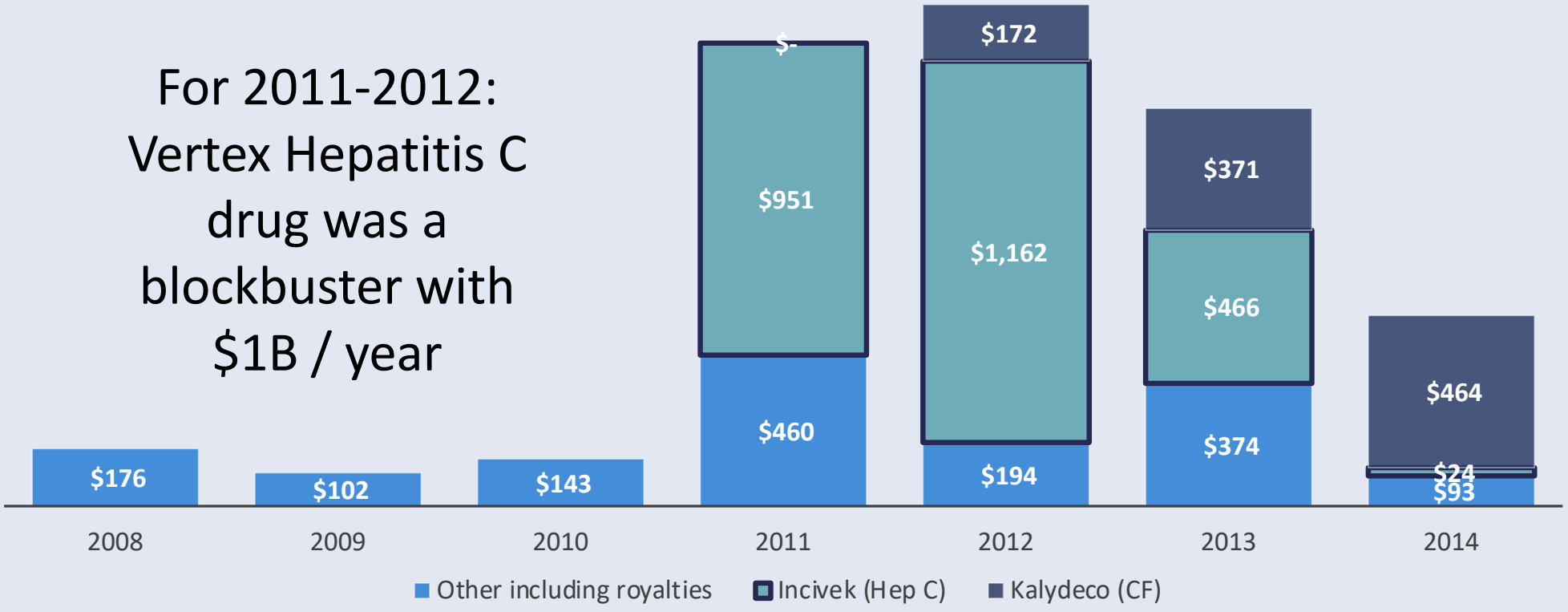
		VX-148	VX-702
	Disease	Psoriasis	Acute Coronary Syndrome
Demand	Prevalence (US)	2.7 million	1.9 million
	Competition	Competitive	Oral vs injectables
Supply	Marketing		Share sales force
	Science	Validated target	Similar drugs toxic and failed
	Partners		
	Remaining cost	$100m	$300m
	Time of case stage	Phase 2	Phase 2
	Prob. approved (Vertex)	.20	.15
	Prob. approved (Tufts)	.26	.26
	Vertex decision	**X Inactive, because too easy**	**✓ Licensed for Alzheimer's**

		VX-148	VX-702	VX-765
	Disease	Psoriasis	Acute Coronary Syndrome	Arthritis (rheumatoid and osteoarthritis)
Demand	Prevalence (US)	2.7 million	1.9 million	21 million (OA)
	Competition	Competitive	Oral vs injectables	Oral vs injectables
Supply	Marketing		Share sales force	Share sales force
	Science	Validated target	Similar drugs toxic and failed	
	Partners			VX-740 Aventis
	Remaining cost	$100m	$300m	$600m
	Time of case stage	Phase 2	Phase 2	Phase 1
	Prob. approved (Vertex)	.20	.15	.22
	Prob. approved (Tufts)	.26	.26	.17
	Vertex decision	**X Inactive, because too easy**	**✓ Licensed for Alzheimer's**	**X Licensed to Roivant, because like 740**

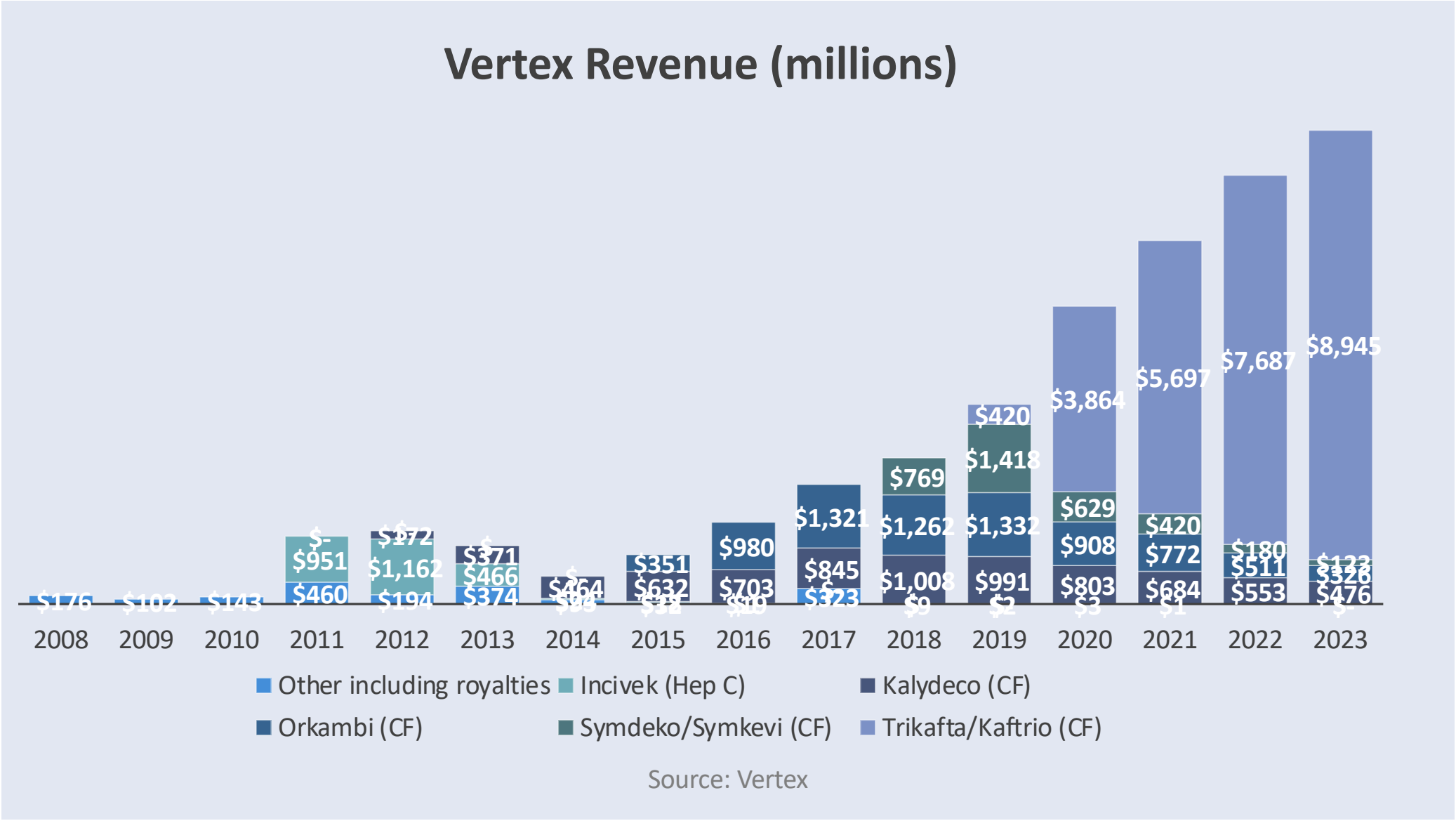
		VX-148	VX-702	VX-765	VX-950
	Disease	Psoriasis	Acute Coronary Syndrome	Arthritis (rheumatoid and osteoarthritis)	Hepatitis C
Demand	Prevalence (US)	2.7 million	1.9 million	21 million (OA)	2.7 million more global
	Competition	Competitive	Oral vs injectables	Oral vs injectables	
Supply	Marketing		Share sales force	Share sales force	Specialty sales force
	Science	Validated target	Similar drugs toxic and failed		Costly trials; test in combo a-interferon
	Partners			VX-740 Aventis	Janssen, Mitsubishi
	Remaining cost	$100m	$300m	$600m	$220m
	Time of case stage	Phase 2	Phase 2	Phase 1	Preclinical
	Prob. approved (Vertex)	.20	.15	.22	.21
	Prob. approved (Tufts)	.26	.26	.17	.17
	Vertex decision	**X Inactive, because too easy**	**✓ Licensed for Alzheimer's**	**X Licensed to Roivant, because like 740**	**✓ Approved**

Vertex Revenue (millions)

For 2011-2012: Vertex Hepatitis C drug was a blockbuster with $1B / year



Source: Vertex



Source: Vertex

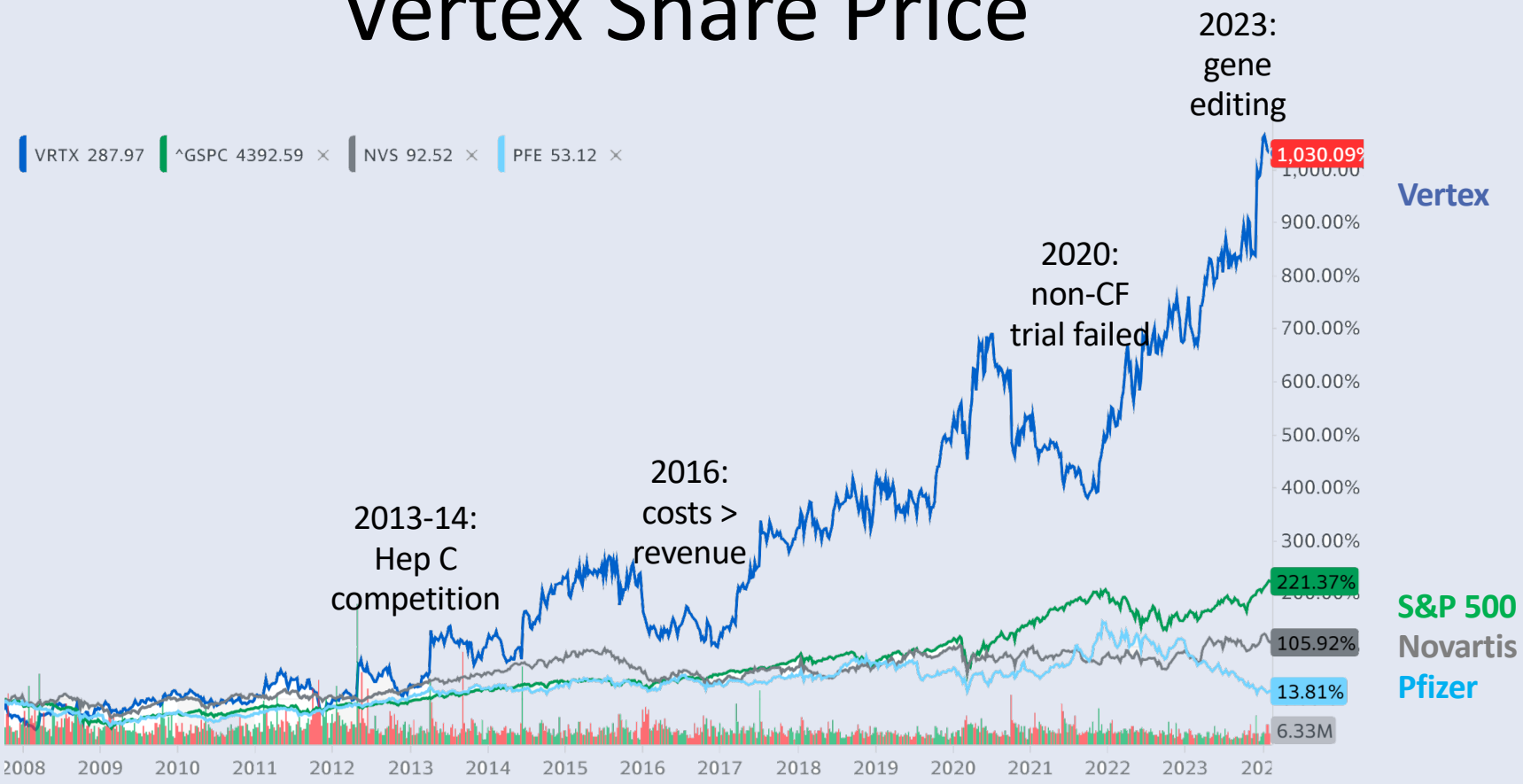
For the 30,000 Americans who live with cystic fibrosis

- Kalydeco can help 6%
- Trikafta can help 90%

Diseases treated by Vertex products

- Cystic fibrosis
- Sickle cell disease
  - Casgevy is a gene therapy approved in December 2023
  - Received priority review voucher

Vertex Share Price



Current Vertex CEO:
We choose diseases with

- High need (not lifestyle)
- Understanding of
  - Causal human biology
  - Biomarker
  - Validated target
- Small, short trials

CEO Reshma Kewalramani

Former Vertex CEO explains his choice

There are 2 videos with Joshua Boger.
This is the second.
https://youtu.be/dZxvRVdlv4E

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FDA Designations

Year	Program	Incentive
1983	Orphan drug	Tax credits and exclusivity
1988	Fast track	FDA can approve after single phase 2
1992	Priority review	6-month (rather than 10-month) review
1992	Accelerated approval	FDA can approve on surrogate (not clinical) end point
2012	Breakthrough therapy	Rolling reviews, smaller trials, & alt. trial designs

Are clinical trials required?

	Same	Related	Novel
Device	No 510(k)		Yes PMA
Drug	No ANDA	Yes NDA	
Biologic	Some trials 351(k)	Yes BLA; 351(a)	

- PMA = Pre-Market Authorization
- ANDA = Abbreviated New Drug Application
- NDA = New Drug Application
- BLA = Biologic License Application

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3 Conclusions

- You now have industry averages, so ask the team why its drug has a higher probability than the average.
- Even if you have a better product, it will not necessarily be adopted by doctors.
- Recognize that many scientists care about more than money.

Next class

- What price should you charge and why?