ORPHAN DRUGS FOR RARE DISEASES: THE NEED TO INNOVATE TO ENABLE ACCESS

Larry Lynd, PhD, FCAHS

SCIENTIST – CHEOS

PROFESSOR AND DIRECTOR – CORE, FACULTY OF PHARMACEUTICAL SCIENCES


YOU CAN DO ANYTHING,
BUT NOT EVERYTHING.
-DAVID ALLEN

Disclosure

- All views are my own
- BC MoH EDRD Advisory Committee
- Funding from Astra, Genzyme, Teva, BC College of Rx, BC Pharm. Assoc,
- Ad Boards – Pfizer, Boehringer, Teva,
- Member – numerous Fed. Gov’t advisory boards
- PI – CIHR Emerging Team for Rare Disease
- Co-lead – MS Society (Biogen, Roche), GenomeCanada, GenomeBC

Objectives

- Provide examples of CEA of orphan drugs
- Describe the evolution and future of drug development internationally
- Describe some of the impacts of rare diseases on the medical system
- Describe challenges in the evaluation of drugs for rare diseases
- Discuss some potential international solutions

SNOWCAP 2019

UBC International Summit on Orphan Drug Pricing and Policy

March 14-15 2019

With invited experts from
CANADA, UNITED STATES, BELGIUM, NETHERLANDS, SPAIN, ENGLAND, SINGAPORE, MALAYSIA, NEW ZEALAND

HOSTED BY THE UBC RARE DISEASE DRUG PRICING AND POLICY RESEARCH CLUSTER AT UBC VANCOUVER CAMPUS
with support from the Vice-President, Research & Innovation Office

THE UNIVERSITY OF BRITISH COLUMBIA

Government of Canada | Gouvernement du Canada

Interim report from the Advisory Council on the Implementation of National Pharmacare

Download the alternative format

(PDF format, 691 KB, 8 pages)

The Advisory Council on the Implementation of National Pharmacare (the Council), announced in Budget 2018, is leading a national dialogue on how to implement affordable national pharmacare for Canadians and their families, employers and governments.

Approaches to national pharmacare supported during the engagement process included a model focused on expensive drugs (including those for rare diseases), a ‘fill the gaps’ approach targeting the uninsured and most vulnerable, and a single-payer public model

The Federal Budget

Making High-Cost Drugs for Rare Diseases More Accessible

For many C… astronomi… financial a… …using

To help Ca… 2022–23, … …arting in

This would … …ost drugs for rare diseases, improve the consistency of decision-making and access across the country, negotiate prices with drug manufacturers, and ensure that effective treatments reach the patients who need them.

$1B over 2 years, starting in 2022, then $500M/yr, ongoing

Case Study 1

Opportunity Cost of Funding Drugs for Rare Diseases: The Cost-Effectiveness of Eculizumab in Paroxysmal Nocturnal Hemoglobinuria

Doug Coyle, PhD, Matthew C. Cheung, MD, Gerald A. Evans, MD

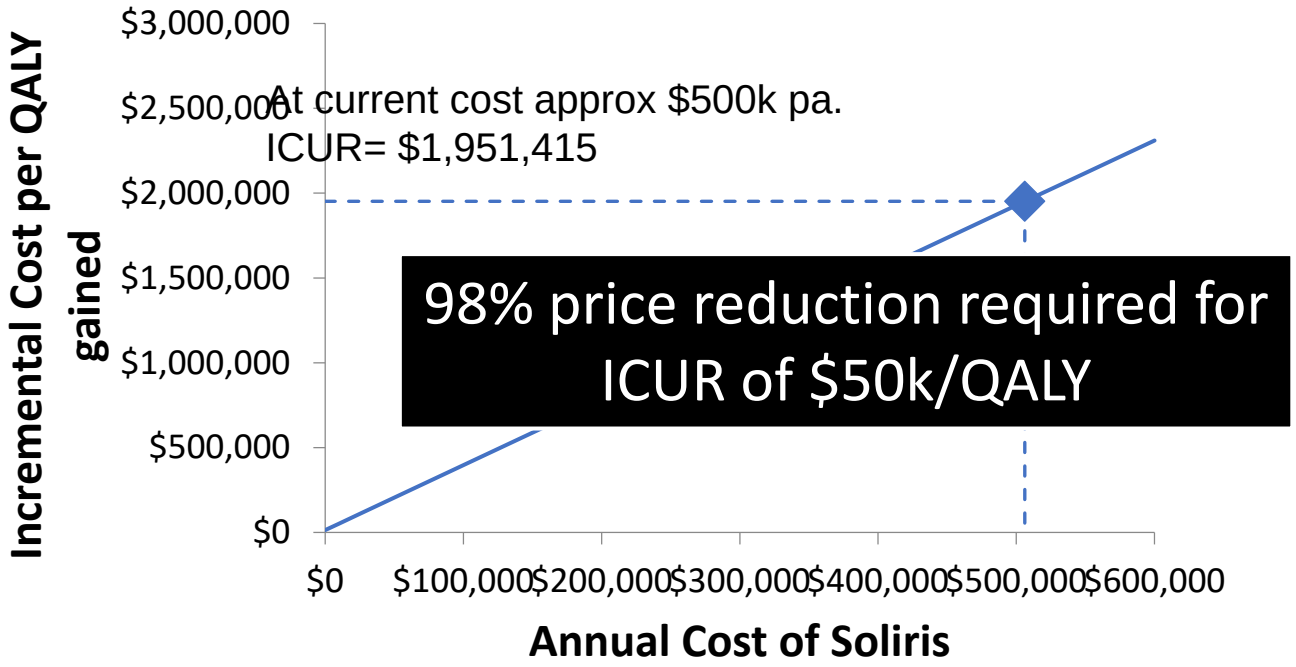
Medical Decision Making 2014

Cost Effectiveness Results

	Eculizumab	No Eculizumab	Increment
Life years	12.22	10.79	1.42
QALYs	9.36	6.60	2.76
Costs	$5,576,792	$187,273	$5,389,519
Incremental cost per LY gained			$3,788,404
Incremental cost per QALY gained			$1,951,415

33 year old patient with no previous thrombosis, no marrow or renal problems and no cytopenia

Break even cost of Eculizumab



Ontario Reimbursement Criteria

Soliris	10 mg/mL (300 mg per vial)	**For the treatment of patients with Paroxysmal Nocturnal Hemoglobinuria (PNH)** meeting the following criteria: The diagnosis of Paroxysmal Nocturnal Hemoglobinuria (PNH) has been made based on the following confirmatory results: • Flow cytometry/FLAER exam with granulocytes clone ≥ 10% **AND** • LDH > 1.5 ULN **AND at least one of the following:** • A thrombotic or embolic event which requi anticoagulant therapy, • Minimum transfusion requirement of 4 unit months, • Chronic or recurrent anemia where causes c and demonstrated by more than one measure of less than or equal to 70 g/L or by more than one measure of less than or equal to 100 g/L with concurrent symptoms of anemia, • Pulmonary insufficiency: Debilitating shortness of breath and/or chest pain resulting in limitation of normal activity (New York Heart Association Class III) and/or established diagnosis of pulmonary arterial hypertension, where causes other than PNH have been excluded, • Renal insufficiency: History of renal insufficiency, demonstrated by an eGFR less than or equal to 60 mL/min/1.73 m^2, where causes other than PNH have been excluded, • Smooth muscle spasm: Recurrent episodes of severe pain requiring hospitalization and/or narcotic analgesia, where causes other than PNH have been excluded.

Funded in a more liberal population than covered by the clinical trial

July 2015

Drug	ivacaftor (Kalydeco) 150 mg tablet
Indication	For treatment of cystic fibrosis (CF) in patients age six years and older who have one of the following mutations in the Cystic Fibrosis Transmembrane conductance Regulator (CFTR) gene: G551D, G1244E, G1349D, G178R, G551S, S1251N, S1255P, S549N, S549R, or G970R.
Listing request	As per indication
Manufacturer	Vertex Pharmaceuticals Incorporated

CDR PHARMACOECONOMIC REVIEW REPORT FOR KALYDECO

CDR conducted additional re-analysis considering price reductions and implications on the cost-effectiveness of ivacaftor, where the CDR "alternative scenario" was used. Table 9 summarizes the results of the cost minimization analysis.

TABLE 9: CDR ANALYSIS OF ICURS BASED ON VARIOUS PRICE REDUCTION SCENARIOS

Scenario	Based on Manufacturer's Analysis		Based on CDR "Alternative Scenario"	
	ICUR	ICER	ICUR	ICER
No price reduction	$356,349	$444,746	$850,932	$844,236
10% price reduction	$320,850	$400,441	$767,977	$761,934
20% price reduction	$258,351	$356,136	$685,022	$679,632
30% price reduction	$311,831	$249,852	$602,067	$597,330
40% price reduction	$214,353	$267,526	$519,112	$515,027
50% price reduction	$178,854	$223,221	$436,257	$432,725
60% price reduction	$143,355	$178,916	$353,202	$350,423
70% price reduction	$107,856	$134,611	$270,247	$268,121
80% price reduction	$72,357	$90,307	$187,293	$185,819
90% price reduction	$36,858	$46,002	$104,338	$103,517

CDR = CADTH Common Drug Review; ICER = incremental cost-effectiveness ratio; ICUR = incremental cost-utility ratio.

Vertex and provinces reach agreement on Kalydeco

Game-changing drug costs $306,600 a year

The Canadian Press Posted: Jun 16, 2014 7:49 PM ET | Last Updated: Jun 16, 2014 8:59 PM ET

It's been a long time coming, but some Canadians with cystic fibrosis should soon be able to begin treatment with an expensive drug that is considered a real game changer for their disease.

Vertex Pharmaceuticals Inc., which makes the drug Kalydeco, announced late Monday that it had reached an agreement with provincial and territorial governments to enable public drug plans to cover the cost of the drug.

A group called the pan-Canadian Pricing Alliance — representing the three territories and all provinces except Quebec — has been involved in negotiations with Vertex for more than a year, with price believed to be the key sticking point.

The company will not reveal the negotiated price, but a previous submission to the Common Drug Review, which assesses new drugs for provincial and territorial drug plans, listed the price at $306,600 per year.

Good Deal?

- “The coverage follows a tentative deal reached recently after 16 months of often stalled negotiations between Vertex and a Canadian provincial bulk drug-buying consortium for what Ontario Health Minister Deb Matthews had called a **“fair price”** for taxpayers.”

Opportunity cost

- Health benefit foregone
  - Incremental lifetime cost of treating one eculizumab patient is $5.4 million
  - Based on threshold of $50,000 expense would only be efficient if we gained 108 QALYs
  - Incremental QALYs from treating one patient with Soliris are 2.76
  - Opportunity cost in terms of lost health benefit is at a minimum 105 QALYs

- Is there any additional “social value” from funding treatments in rare disease?

Opportunity cost

- Alternative uses not funded
  - Annual cost of funding eculizumab for PNH in Ontario was estimated to be $9 million per year
  - With this we could fund any of the following
    - 1 additional public health nurse visits per newborn
    - 200,000 ambulance co-payments
    - 180,000 physiotherapy treatments
    - Support for 400 individuals with mental illness to live in the community
    - 4 supervised injection facilities

Rare genetic diseases

5.3% of live births have early-onset genetic conditions

Includes 7,000 single-gene disorders

Account for > 50% of pediatric hospitalization costs

Significant cause of disability in children and youth

Rare variants (genetic/phenotypic) of common diseases

Sources: **1.** Baird et al. (1988) "Genetic disorders in children and young adults: A population study", American Journal of Human Genetics, 42: 677-693.; **2.** Boycott et al. (2013) "Rare-disease genetics in the era of next-generation sequencing: discovery to translation", Nature Reviews Genetics, 14: 681-692.; **3.** McCandless et al. (2004) "The burden of genetic disease on inpatient care in a children's hospital", American Journal of Human Genetics, 74: 121-127.

Rare diseases are not rare

- Each individual disease is rare BUT there are many rare diseases so collectively, they are common
- Depending on definition of “rare”, estimates are from 1/50-1/12 Canadians have a “rare” disease
- 20% of Canadians at any time have a chronic disease (Stats Can 2016)
- Therefore, a significant component of the chronic disease population (10-40%) is composed of people with rare diseases

It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us, ...

Charles Dickens, *A Tale of Two Cities*, (1859), p. 1

Key challenges for rare / genetic diseases

Access to effective treatment [Cost]

Access to timely diagnosis

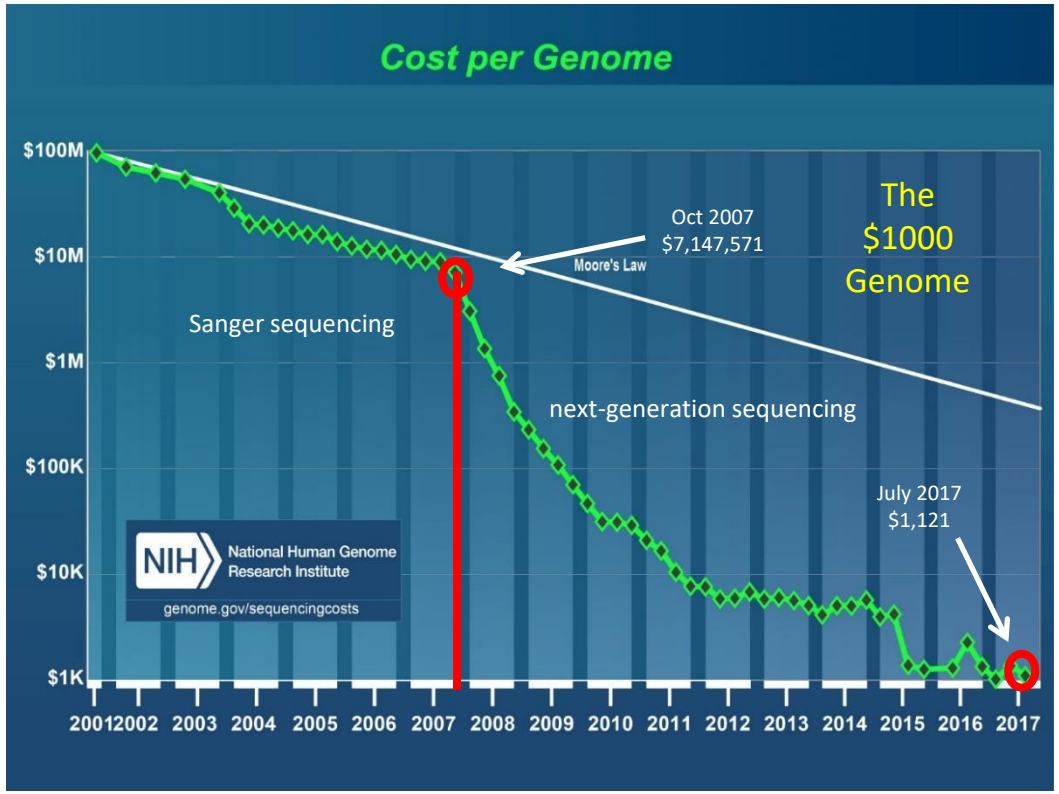
Making evidence-based decisions!

The Orphan Drug Evidence Challenge

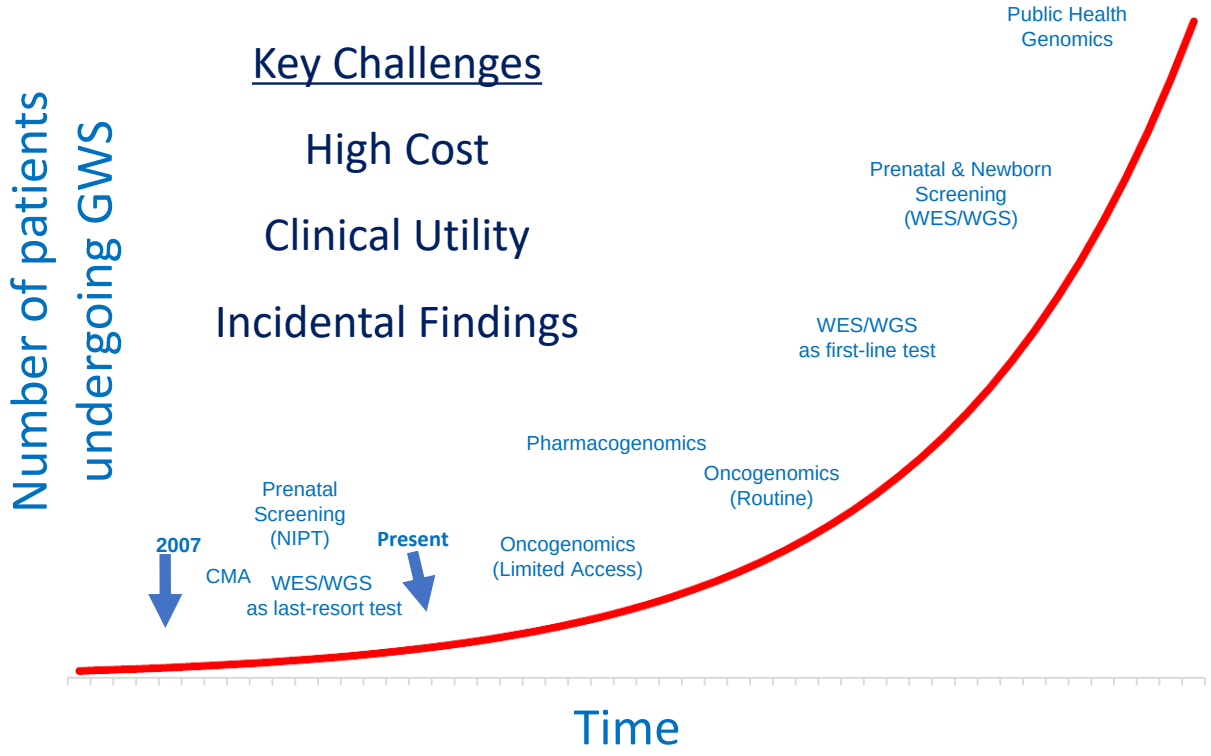
- Small sample, heterogeneity
- Lack of natural history disease models
- Inability to recruit patients into RCTs
- Lack of validated treatment response and no standard of care
- No effectiveness data
- ?Poor patient willingness to

Does this lead to lower evidentiary threshold, vis a vis a lower bar for market authorization?

Access to testing

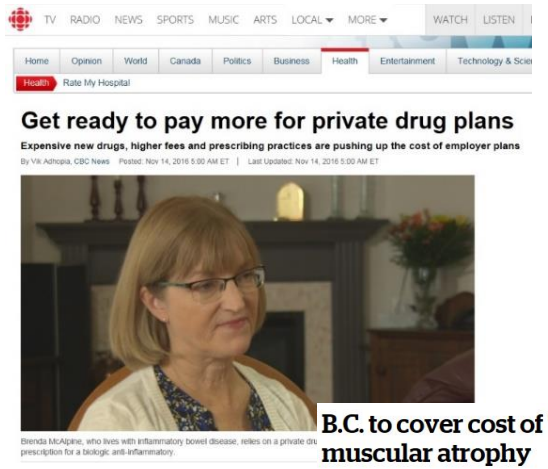


Clinical Implementation of Genome-Wide Sequencing



Chicago Tribune

Turn your head, cough, submit your DNA: Your next physical may include genetic testing.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Get ready to pay more for private drug plans
Expensive new drugs, higher fees and prescribing practices are pushing up the cost of employer plans
By Vik Adhopia, CBC News Posted: Nov 14, 2016 5:00 AM ET | Last Updated: Nov 14, 2016 5:00 AM ET

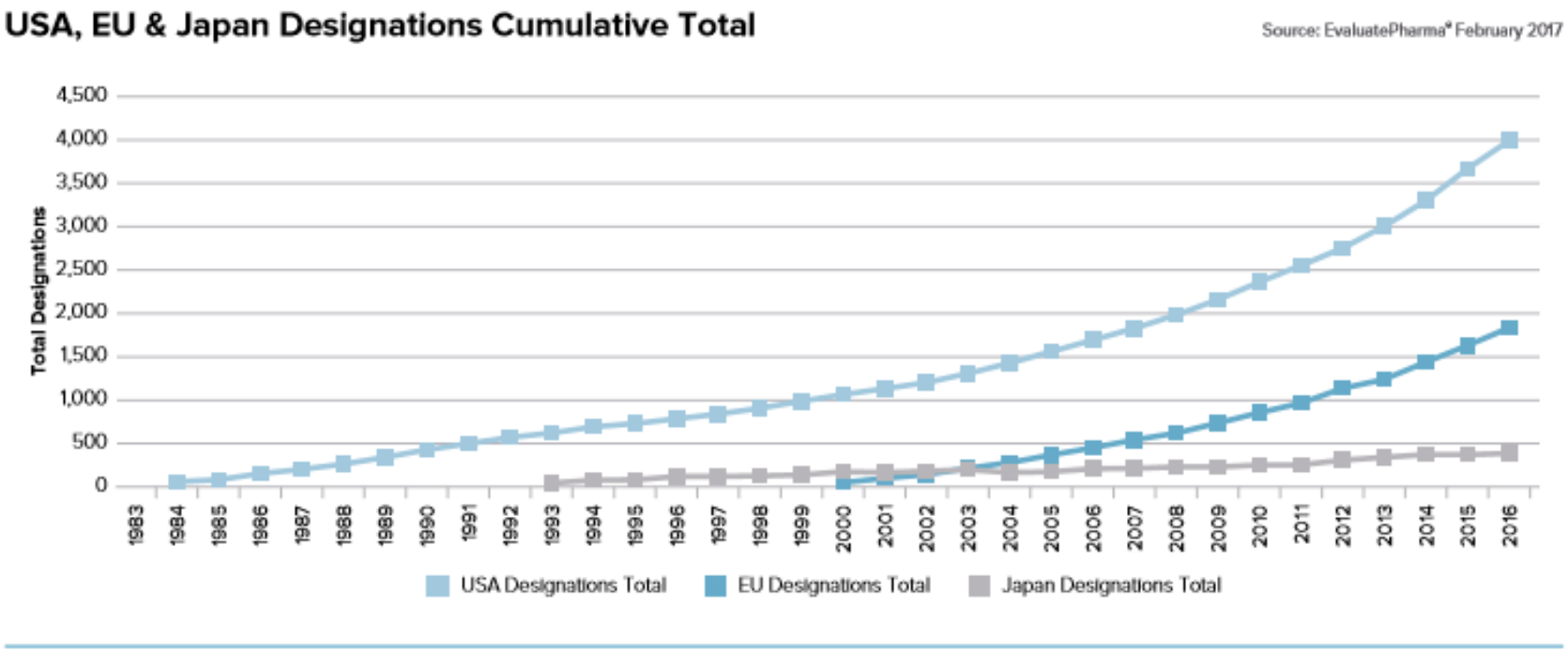

$750K drug that could save UBC student now covered on a case-by-case basis in B.C.
Soliris will now go to an expert Expensive Drugs for Rare Disease advisory committee
Michelle Ghoussoub · CBC News · Posted: Nov 20, 2017 6:09 PM PT | Last Updated: November 20, 2017


B.C. to cover cost of 'life-changing' drug for spinal muscular atrophy
Type 1 SMA, a neuromuscular disease, affects around 30 people in the province, mostly babies
CBC News · Posted: Oct 03, 2018 7:30 AM PT | Last Updated: October 3, 2018

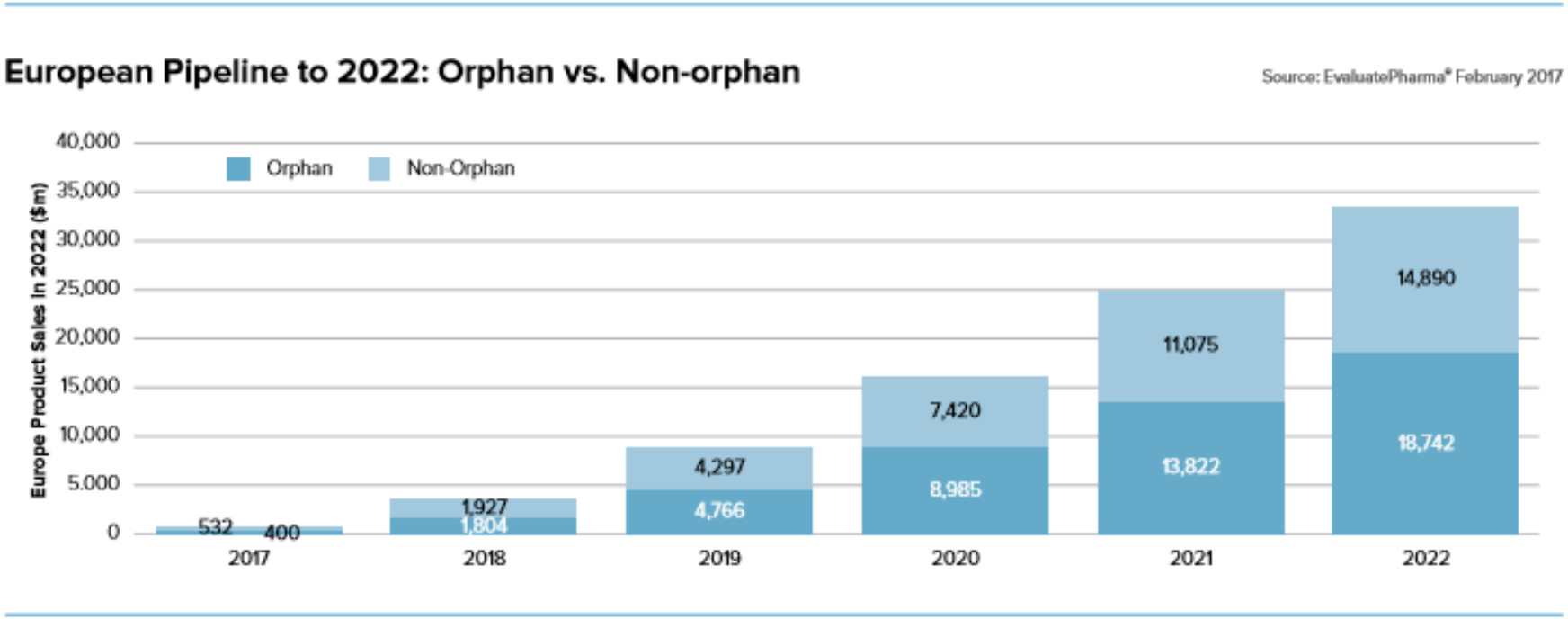
Currently in BC

- “Currently cover the cost of 16 expensive drugs”
  - “List prices range $100k to >$3M”
- “13 additional drugs under review”
- “Potential cost of $75M for ~250 patients”
  - Current P’care budget ~$1.2B
  - 6.2% of P’care dedicated to 250 patients

The future is now



The future is now



Rationale for Orphan Drug Status

"Non commercial therapies"

- Prevalence too low to provide an adequate return to R+D expenditure

Reduced R&D Costs

- **USA**: 50% Tax Credit on R&D Cost
- **USA**: R&D Grants for Phase I to Phase III Clinical Trials ($30m for each of fiscal years 2008-12)
- **USA**: User fees waived (FFDCA Section 526: Company WW Revenues <$50m)

Justification?

- Development of a promising drug is in the "public interest"
- People with rare diseases are entitled to same quality of treatment

Market Trends

Trends in Sales

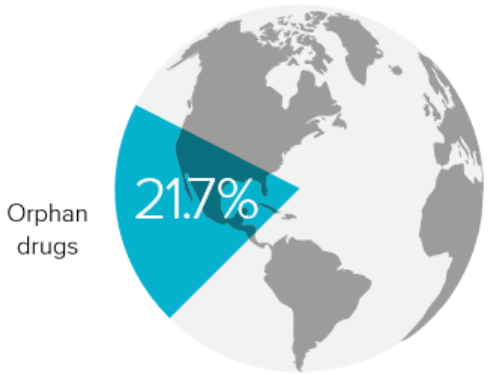
Worldwide orphan drug sales forecast to be

$262 Billion

Compound Annual Growth Rate (CAGR) for orphan drugs will be

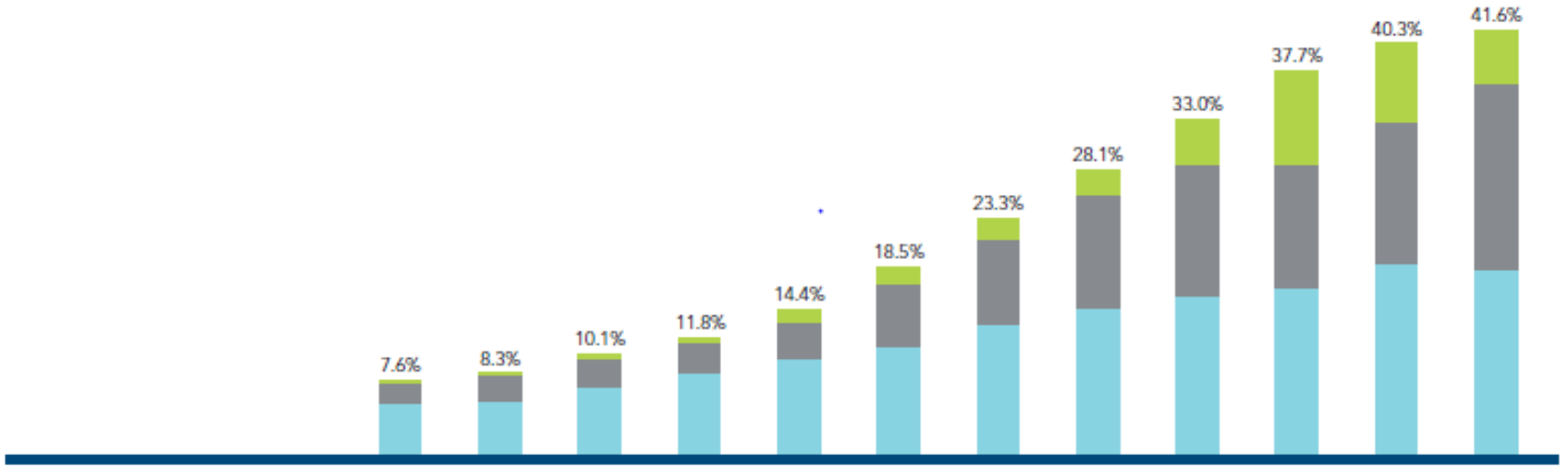
2x non-orphan drug market

Sales 2024



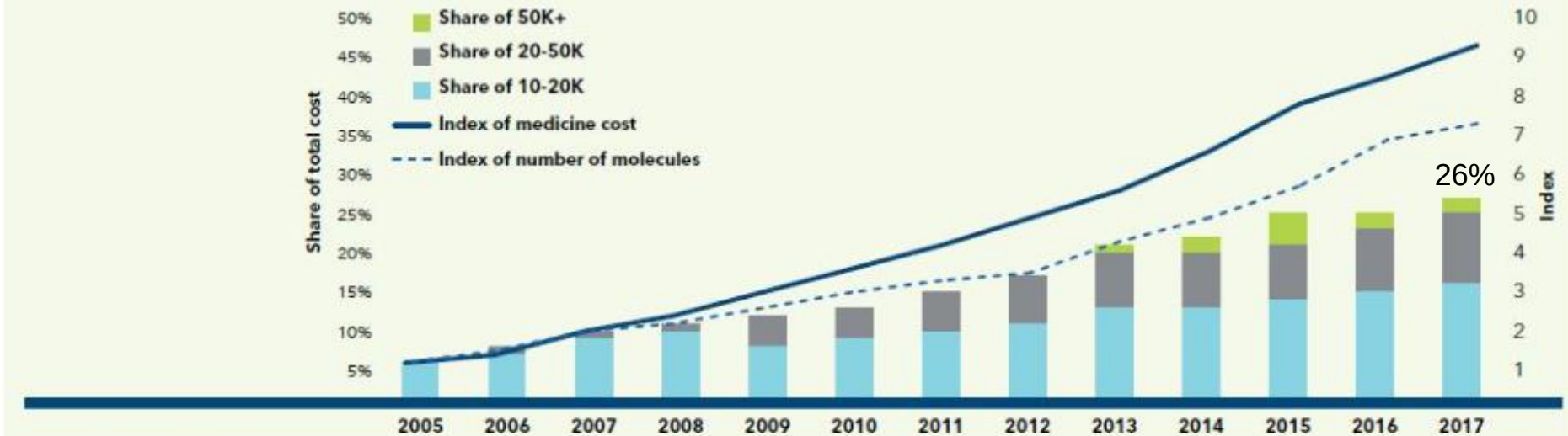
Orphan drugs will account for 21.7% of prescription sales

FIGURE 10 Share of Sales for High-Cost Patented Medicines, 2006 to 2017



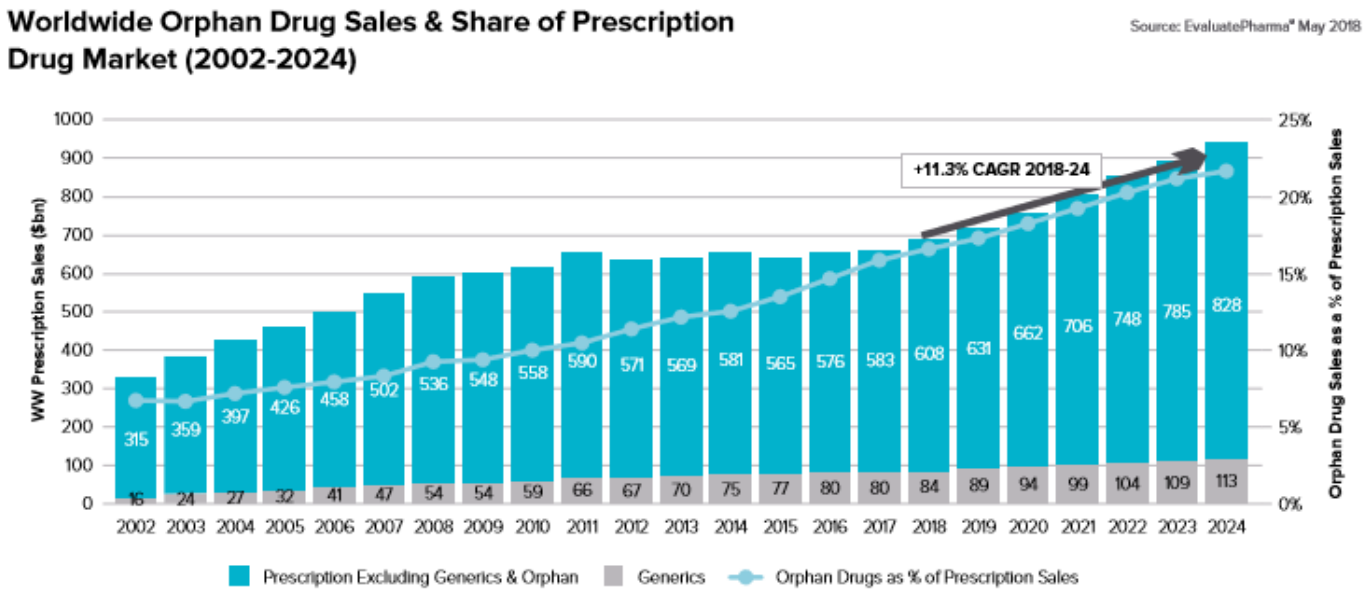
SHARE OF SALES %	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
50K+	0.3	0.4	0.5	0.7	1.3	1.7	2.2	2.7	4.5	9.2	7.8	5.3
20K-50K	2.1	2.4	2.7	3.0	3.5	6.0	8.2	10.9	12.9	12.0	13.8	18.1
10K-20K	5.2	5.5	6.9	8.1	9.6	10.8	12.9	14.5	15.6	16.5	18.7	18.2
Total	7.6	8.3	10.1	11.8	14.4	18.5	23.3	28.1	33.0	37.7	40.3	41.6

Figure 13. Trends in the Number and Share of High-Cost Medicines, Private Drug Plans, 2005 to 2017



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Share of total cost	6%	7%	9%	10%	11%	13%	15%	17%	19%	22%	24%	25%	26%
Number of molecules	23	31	41	45	56	65	72	77	95	107	126	154	163

The future is now



EvaluatePharma Report 2018

Example EDRD Costs

DRUG NAME	BRAND NAME	CONDITION	ANNUAL COST[a]
Asfotase alfa	Strensiq	Hypophosphatasia	**$2,200,000**
Nusinersen	Sprinraza	SMA	**$708,000 Yr1** **$354,000 Yr2+**
Eculizumab	Soliris	aHUS	**$701,000**
Alglucosidase	Myozyme	Late Onset Pompe	**$612,000**
Eculizumab	Soliris	PNH	**$526,000**
Ivacaftor	Kalydeco	Cystic Fibrosis	**$306,000**
Agalsidase beta	Fabrazyme	Fabry	**$291,000**
Miglustat	Zavesca	Niemann Pick C	**$238,000**

[a] Ingredient cost only (excludes markup and dispensing fees) and based on list price (as of Jan 2017) using usual maintenance dosing for an assumed 70kg adult (unless otherwise specified; figures rounded to the nearest $1,000).

Myth: High OD costs are needed due to high R&D costs

Table 2 Estimated clinical costs, expected costs and out-of-pocket clinical costs per approved drug

Drug Type	Phase	Estimated out-of-pocket clinical costs (in millions of 2013 USD)	Probability of entering phase	Expected out-of-pocket clinical costs (in millions of 2013 USD)	Overall Probability of clinical success	Out-of-pocket clinical cost per approved drug (in millions of 2013 USD)
Non-orphan	1	$2.6	100%	$2.6	10.44%	$291.4
	2	$9.9	64.5%	$6.4		
	3	$102.7	20.9%	$21.5		
	Total			$30.5		
Orphan	1	$3.8	100%	$3.8	32.93%	$166.1
	2	$23.7	86.8%	$20.6		
	3	$49.9	60.8%	$30.3		
	Total			$54.7		

Estimated out-of-pocket clinical costs = costs accrued by the researcher to conduct the trial, Expected out-of-pocket clinical costs = cost accrued by the researcher adjusted for trial success, Overall probability of success = probability of success from phase 1 to regulatory approval

Jayasundara et al Orph J Rare Dis 2019

A couple of tragic cases

- ***Betaine*** to lower homocysteine
- Used for several decades – raw chemical obtained from Signa Chemicals
- Annual cost of ALL BC patients - $11,000
- Now patented as Cystadane, no clinical trials, no R&D
- Total cost now $310k annually

ANALYSIS

Rare diseases, expensive drugs - Health Canada showdown coming

JUSTINE HUNTER ›
VICTORIA
PUBLISHED JUNE 24, 2018
9 COMMENTS

TRENDING

1 Federal budget 2019 highlights: 10 things you need to know

THE GLOBE AND MAIL

- nephropathic cystinosis
- treated with Cystagon at ~$6,000/yr (available via HC SA program).
- HC approved Procysbi – long acting form, @$300k/yr per pt.
- Cystagon price increase to $40k per year

Opportunity Costs are Significant

- BC example:
  - BC PharmaCare total budget = $1.23 BN (FY 17/18)
  - Any growth must cover base (existing drugs/pharmacy services) and new demands (e.g., new drugs, new indications, new policy changes etc.)

BC Ministry Coverage	Annual Expenditures	Number of beneficiaries
EDRD	Est. **$33 M** (FY 18/19) Doubled since 2016 30% growth in 2018	**~100**
PharmaCare Plan G (Mental Health)	**$32.7 M** (FY 16/17)	**40,000**
PharmaCare Plan B (Residential Care)	**$37.9 M** (FY 16/17**)**	**30,000**
PharmaCare Plan P (Palliative Care)	**$19.5 M** (FY 16/17)	**12,800**
Fair Pharmacare Plan Refresh (Universal Income-Based) (lowered income threshold Jan/19)	**Est. $35 M / Yr** (FY 19/20) ($105/3 yr)	**240,000 families**

Why? Market Failure in Healthcare!

- Perfect market → no market power on supply or demand side
  - Balance of information between consumers and producers
  - Individual decisions maximize utility
    - Revealed preferences

Why? Market Failure in Healthcare

- Demand for health, not healthcare
- Information asymmetry between patients, physicians
- Caring externalities
- Distortion of healthcare prices by insurance
  - Users (Consumers) don't pay → distortion in demand
- No competition between health services

- Result – perversely inflated prices, and thus cost

Implications

- Increase market pressures
  - Orphan designation → Orphan pricing
  - Public – Private sector conflict
    - profit maximization vs. finite budget management
- Market failure
  - Insurance model to blame
- Limited patient access to potentially effective therapy

What is the right price?

- What is our societal willingness to pay?
  - Including innovation
- We are paying a premium for drugs for rare diseases
- I would argue, it is not sustainable

Measuring the societal value of orphan drugs

Patient (2015) 8:93–101
DOI 10.1007/s40271-014-0109-5

ORIGINAL RESEARCH ARTICLE

Challenges in Measuring the Societal Value of Orphan Drugs: Insights from a Canadian Stated Preference Survey

Nick Dragojlovic · Shirin Rizzardo · Nick Bansback · Craig Mitton · Carlo A. Marra · Larry D. Lynd

Published online: 14 January 2015

Abstract
Background Expensive drugs for rare diseases (i.e. orphan drugs) often do not meet traditional cost-effectiveness criteria and thus put further strain on limited healthcare budgets. Failing to provide medically necessary care to patients, however, violates one of the underlying tenets of most public health insurance systems—equity. sum' framing commonly used to describe the policy challenge posed by orphan drugs.
Method We illustrate these challenges using data from an original survey of 2,005 Canadian adults. Respondents completed two tasks in which they were asked to choose between funding the treatment of patients suffering from either rare or common diseases.

VALUE IN HEALTH ■ (2018) ■–■

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ScienceDirect
journal homepage: www.elsevier.com/locate/jval

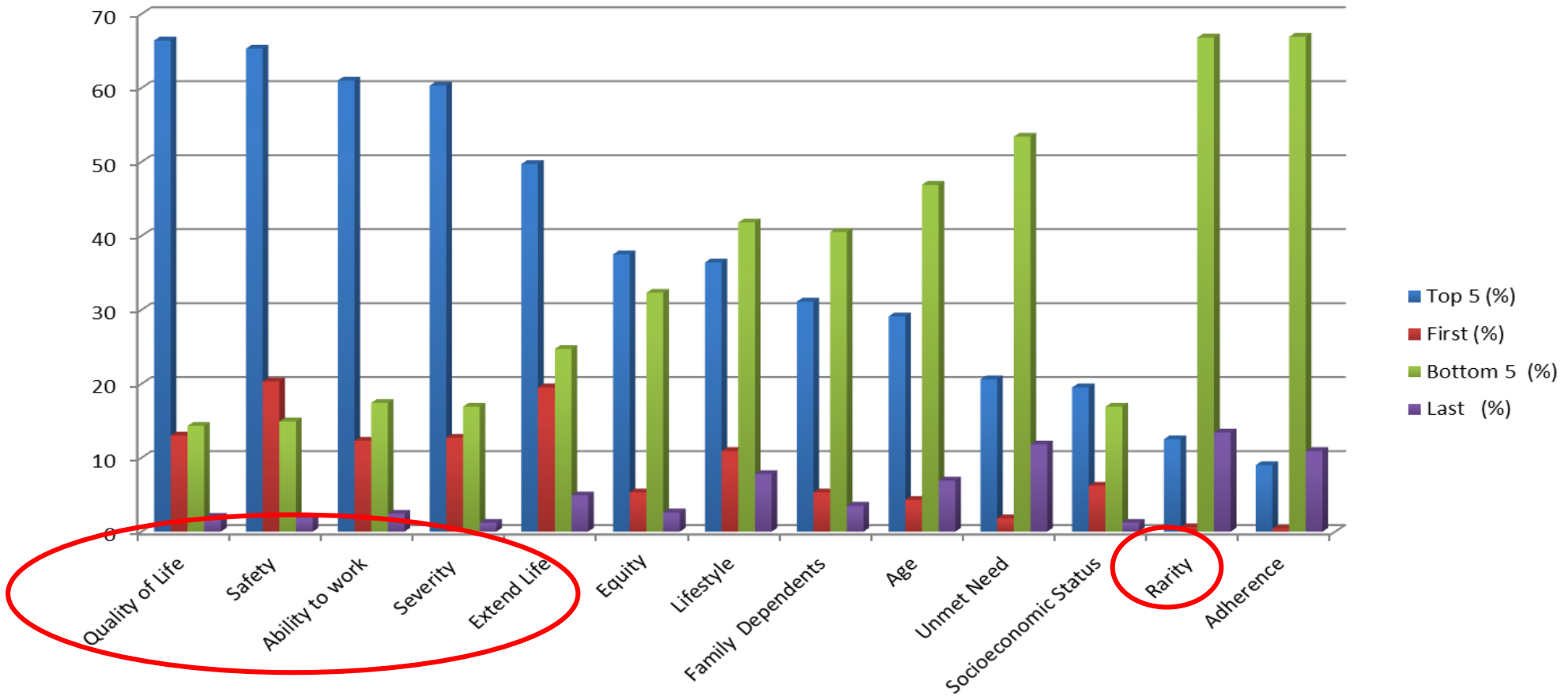
Preference-Based Assessments

Evaluating Canadians' Values for Drug Coverage Decision Making

Shirin Rizzardo, MSc [1], Nick Bansback, PhD [2,3], Nick Dragojlovic, PhD [4], Conor Douglas, PhD [5], Kathy H. Li, PhD [4], Craig Mitton, PhD [2,6], Carlo Marra, PharmD, PhD [7], Litsa Blanis, BSc [4], Larry D. Lynd, PhD [3,4,*]

[1]Pharmaceutical Services Division, British Columbia Ministry of Health, Victoria, BC, Canada; [2]Faculty of Medicine, School of Population and Public Health, University of British Columbia, Vancouver, BC, Canada; [3]Centre for Health Evaluation and Outcome Sciences, Providence Health Care Research Institute, Vancouver, BC, Canada; [4]Faculty of Pharmaceutical Sciences, University of British Columbia, Vancouver, BC, Canada; [5]Department of Science and Technology Studies, York University, Toronto, ON, Canada; [6]Centre for Clinical Epidemiology and Evaluation, Vancouver Coastal Health Research Institute, Vancouver, BC, Canada; [7]National School of Pharmacy, University of Otago, Dunedin, New Zealand

Relative importance of factors that should be considered in reimbursement decisions



Case Study

TIMES COLONIST ≡ MENU

UVic student takes lead in $60-million class-action suit over costly drug

Katie DeRosa / Times Colonist
JULY 24, 2018 03:35 PM

The suit alleges that failing to cover a "medically necessary treatment" is a violation of the charter rights of cystic fibrosis patients with the mutation and hopes to change how Canada handles rare diseases.

Committee recommends against funding $250,000-a-year Orkambi cystic fibrosis drug

KELLY GRANT › HEALTH REPORTER
PUBLISHED OCTOBER 4, 2018

Canadian governments should not pay for a $250,000-a-year cystic fibrosis medication because it is not clear the drug actually improves patients' health, according to a fresh review that has devastated some with the potentially fatal lung disease.

For the second time in as many years, the expert committee that advises the provinces and territories on drug coverage has said no to Orkambi, a pill designed to help correct the most common underlying genetic cause of CF.

The committee's rejection is not binding, but the provinces and territories almost never break ranks with the Canadian Agency for Drugs and Technologies in Health (CADTH), the independent organization that oversees the expert committee.

"We're beyond disappointment," said Kim Steele, the director of government and community relations at Cystic Fibrosis Canada, a charity and patient organization. "Our community is devastated. This is a medicine that we know works for some people."

THE GLOBE AND MAIL

CADTH COMMON DRUG REVIEW

CADTH Canadian Drug Expert Committee Recommendation

(Final)

LUMACAFTOR/IVACAFTOR (ORKAMBI — VERTEX PHARMACEUTICALS (CANADA) INCORPORATED)
Indication: Cystic fibrosis, F508del-cystic fibrosis transmembrane conductance regulator gene mutation in patients aged six years and older.

RECOMMENDATION
The CADTH Canadian Drug Expert Committee recommends that lumacaftor/ivacaftor not be reimbursed for the treatment of cystic fibrosis in patients aged six years and older who are homozygous for the F508del mutation in the cystic fibrosis transmembrane conductance regulator gene.

Cost-effectiveness analysis of lumacaftor and ivacaftor combination for the treatment of patients with cystic fibrosis in the United States

Dolly Sharma, Shan Xing, Yu-Ting Hung, Rachel N. Caskey, Maria L. Dowell and Daniel R. Touchette

Orphanet Journal of Rare Diseases 2018 **13**:172
https://doi.org/10.1186/s13023-018-0914-3
Received: 4 July 2018 | **Accepted:** 12 September 2018 | **Published:** 29

Scenario	Treatment	Cost ($) *	QALY	Incremental Cost ($)	Incremental Effectiveness (QALY gained)	ICER ($/QALY)
10-year time horizon						
Base-case	Usual care	116,156	6.84	1,662,765	0.45	3,655,352
	Lumacaftor/ivacaftor	1,778,921	7.29			
Worst-case	Usual care	116,156	6.84	1,677,[illegible]	[illegible]	[illegible]
	Lumacaftor/ivacaftor	1,794,056	7.04			
2-year time horizon						
Base-case	Usual care	30,469	2.23	531,6[illegible]		
	Lumacaftor/ivacaftor	562,075	2.3			
Worst-case	Usual care	30,469	2.23	532,262	0.06	9,292,285
	Lumacaftor/ivacaftor	562,731	2.28			

ICER
$3.4 - $9.2M/QALY

INDEPENDENT

Breakthrough cystic fibrosis drug destroyed while thousands of NHS patients wait amid funding impasse

'It's heart-breaking that packets of lifesaving drugs have been thrown away'

Alex Matthews-King Health Correspondent | 1 day ago | 119 shares |

People with cystic fibrosis have to regular inhaled medication to prevent infections and clear mucus from their lungs *(Getty Images)*


SOLUTION 1
SOLUTION 3
SOLUTION 2

Canadian Fabry Disease Initiative

- Public/Private partnership
- Procurement and distribution
- Treatment guidelines/criteria
- Registry → natural history, real world evidence of treatment effectiveness
- Equity of access

cfdi
CANADIAN FABRY DISEASE INITIATIVE
Making a difference

(Inter)National Strategy

- Equity / Consistency of Access
- Purchasing Power
- Managed access agreements, support for real world evidence generation
- price, evidence, decision transparency
- Increase negotiating power
  - price
  - data collection/registry development

Need for International Collaboration on Global Issue

Access
- Unmet need
- Few therapeutic options
- Variable coverage decisions→ international pressure

Evidence
- Limited
- Poor quality
- Few patients

Pricing / Cost
- Excessive, unfair
- Variable pricing
- Unsustainable
- Sig. Opportunity Cost

Example: $ Per Vial		Annual Cost	% Diff.
Canada	$2,383	372k	--
France	$2,103	328k	-12%
Italy	$1,948	303k	-18%
Sweden	$2,326	362k	-3%
UK	$1,558	243k	-35%
US	$1,898	296k	-20%
Australia	$1,387	216k	-42%
Netherlands	$2,043	319k	-14%
Norway	$2,006	313k	-16%

New Ideas / Bold Solutions

By Duska Anastasijevic

Mayo Clinic joins hospitals to launch a not-for-profit generic drug company

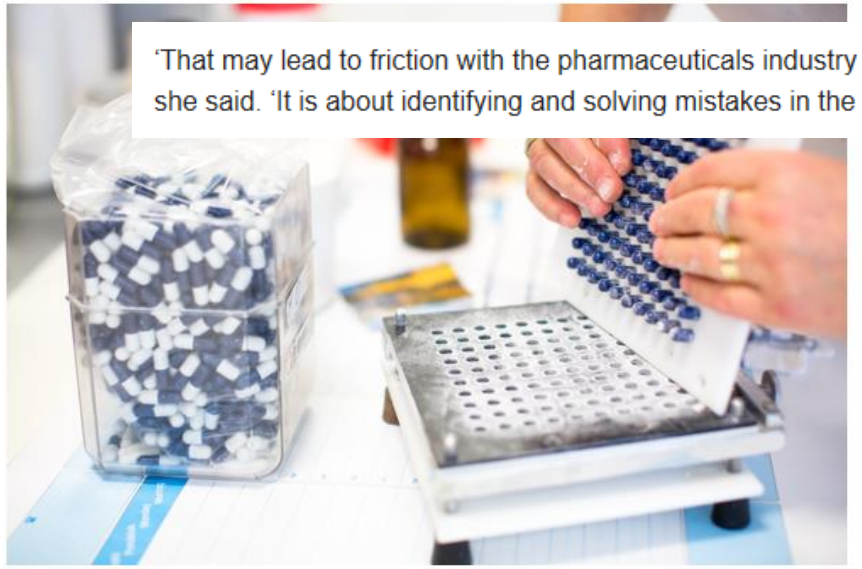
September 6, 2018

ROCHESTER, Minn. — Mayo Clinic joins a coalition of seven hospitals in launching Civica Rx, a not-for-profit generic drug company that will help patients by addressing shortages and high prices of lifesaving medications. The company, which is organized as a Delaware nonstock, not-for-profit corporation, will be headquartered in Utah.

New Ideas/ Bold Solutions

Amsterdam hospital gets €5m from lottery to make its own medicines

Health February 11, 2019



'That may lead to friction with the pharmaceuticals industry but that is not our aim,' she said. 'It is about identifying and solving mistakes in the system.'

Photo: Depositphotos.com

Amsterdam's UMC teaching hospital has been given a €5m donation by a lottery organisation to prepare more drugs in its own pharmacy and so produce them more cheaply and more quickly than the pharmaceuticals industry.

Innovation Required to Facilitate Access

- Current model is not sustainable – more than $$$ required
- Drug development/evidence, reimbursement
- Reimbursement / procurement strategies
  - Disease registries, PFP, performance based pricing, Managed access
- Separate budget for drugs for rare diseases
- Broader application of ‘big data’
  - Use of RWD to generate RWE
    - Support managed access agreements (with teeth)
    - Precision therapeutics –genetic/phenotypic
    - Natural history models
    - NOC/reimbursement with evidence generation

Thank You

43 Drugs with sales >$1 billion with orphan indications

Table 1 – Drugs obtaining at least one orphan designation and having sales of more than $1 billion in 2008.

Trade name	Generic name	Year of orphan designation	Year of market approval	Number of therapeutic designations
Humira	Adalimumab	2005	2008	2
Fosamax	Alendronate	2001		2
Ceredase	Alglucerase	1985	1991	2
Abilify	Aripiprazole	2006		1
Avastin	Bevacizumab	2003		4
Velcade	Bortezomib	2003	2003	2
Tracleer	Bosentan	2000	2001	2
Botox	Botulinum toxin	1984	1989	4
Novoseven	Coagulation factor	1988	1999	10
Epogen	Epoetin alfa	1986	1989	2
Procrit	Epoetin alfa	1987		3
Enbrel	Etanercept	1998	1999	2
Neupogen	Filgrastim	1990	1994	6
Neurontin	Gabapentin	1995		1
Copaxone	Glatiramer acetate	1987	1996	2
Gleevec	Imatinib	2001	2001	7
Cerezyme	Imiglucerase	1991	1994	1
Remicade	Infliximab	1995	1998	6
Betaseron	Interferon	1988	1993	2
Avonex	Interferon	1991	1996	2
Rebif	Interferon	1992		2
Lamictal	Lamotrigine	1995	1998	1
Revlimid	Lenalidomide	2001	2006	4
Lupron	Leuprolide	1988	1993	1
Mobic	Meloxicam	2002	2005	1
Provigil	Modafinil	1993	1998	1
CellCept	Mycophenolate	2006		1
Sandostatin	Octreotide	1998	1998	3
Kogenate	Octocog	1989	1993	2
Taxol	Paclitaxel	1997	1997	1
Pegasys	Peginterferon	1998		2
Alimta	Pemetrexed	2001	2004	1
Mirapex	Pramipexole	2008		1
Evista	Raloxifene	2005	2007	1
Rituxan	Rituximab	1994	1997	4
Vioxx	Rofecoxib	2004		1
Prograf	Tacrolimus	1998	2006	2
Cialis	Tadalafil	2006		1
Temodar	Temozolomide	1998	1999	2
Spiriva)	Tiotropium	2008		1
Topamax	Topiramate	1992	2001	1
Herceptin	Trastuzumab	1999		1
Zometa	Zoledronic acid	2000	2001	1

Cote and Keating. Values in Health 2012