Drug Availability in Canada

IMPROVING ACCESS TO INFORMATION USING PUBLIC DATA

Background

- *"The escalation in shortages of prescription drugs in the past few years and the ongoing disruptions to supply experienced in Canada and globally are matters of grave concern to the Canadian Medical Association"*
- *"In the United States the number of drug shortages from 2006 to 2010 grew by more than 200 percent."*
- *"A CMA survey of physicians in September 2012 found that 66% of respondents indicated that drug shortages have gotten worse since 2010 and 64% stated that the shortages have had consequences for their patients or practice. Similarly, the results of the 2012 Canadian Pharmacists Association survey of pharmacists found that over 91% of pharmacists had been inconvenienced by shortages and 51% indicated that patients' care had been compromised."*

Quotes from CMA Policy position statement on prescription drug shortages in Canada

More background

- Drug shortages the new normal and hard to fix
- Drug shortages: Patients and healthcare providers are all drawing the short straw
- See here for a list of articles.

Plenty of data but no information

- It is now mandatory for manufacturers to report shortages and this data is available at drugshortagescanada.ca
- But this is just data and falls far short of *information*. For example, it may report that the 250 count bottle of APO-Fluvoxamine has been discontinued. But it fails to tell you anything about the 100 count bottle by that manufacturer or how many other forms by other manufacturers of the same medication are available.
- In other words, there is no *information* available on drug *availability.* Shortage and discontinuation data without the necessary context is of little value.

Where are people getting information now?

- Patients and subsequently physicians appear to be getting information via Facebook.
- A patient goes in to get a refill on their prescription. The pharmacist says they can't get it right now. The patient goes on Facebook and mentions this on a medically-relevant group. Then patients in the group on the same medication go to their pharmacists, discover that what they heard is true and then book appointments with their physician. Physicians are flooded with requests for appointments and scramble to get information on the availability of alternatives while at the same time booking all of these appointments.
- This inefficient & expensive process is well-documented in surveys done by the CMA.

The big idea

- Build a reporting mechanism to provide pharmacists and physicians with reliable information on the current availability of pharmaceutical medications.
- Build up a database over time to calculate and report the accuracy with which manufacturers estimate the duration of shortages.
- Build predictive modeling to enable physicians to anticipate shortages and prescribe alternate medications when appropriate.

Who needs this information

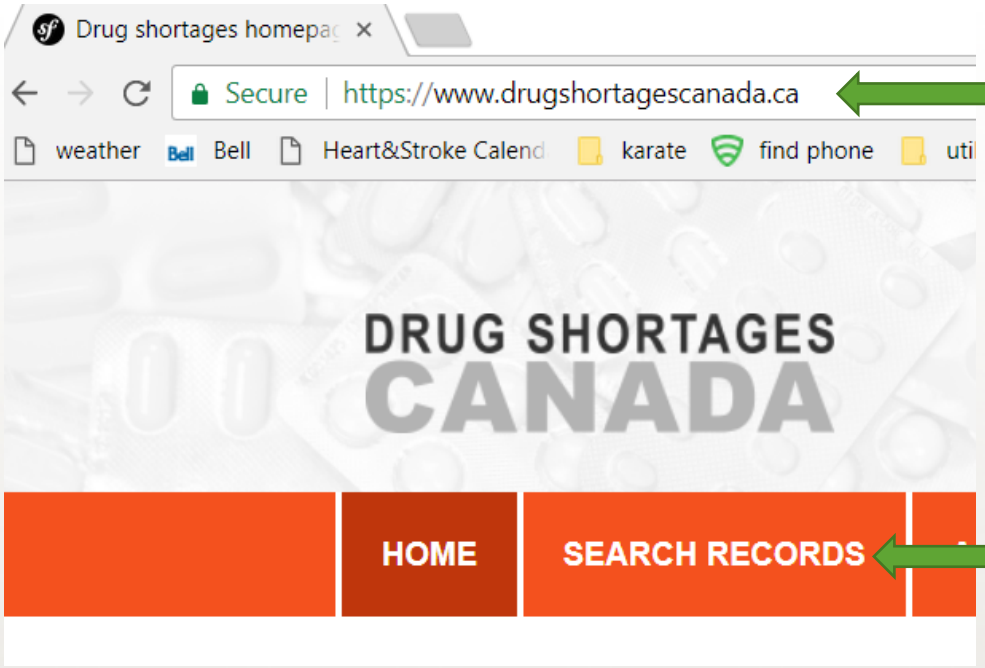
- Physicians to aid with patient care
- Pharmacists to aid with patient care
- Pharmaceutical suppliers (intermediary between manufacturers and pharmacies) to update their system to reflect accurate information.
- Provincial and federal governments to make informed decisions on drug formularies.

A note on ethics

- Stockpiling of medications is a danger. For this reason, the general public is not a target audience for this information.
- Different audiences require different information and the risk of stockpiling should be considered for each audience.

Data Source #1: drugshortagescanada.ca

Drug shortage/discontinuation data



www.drugshortagescanada.ca

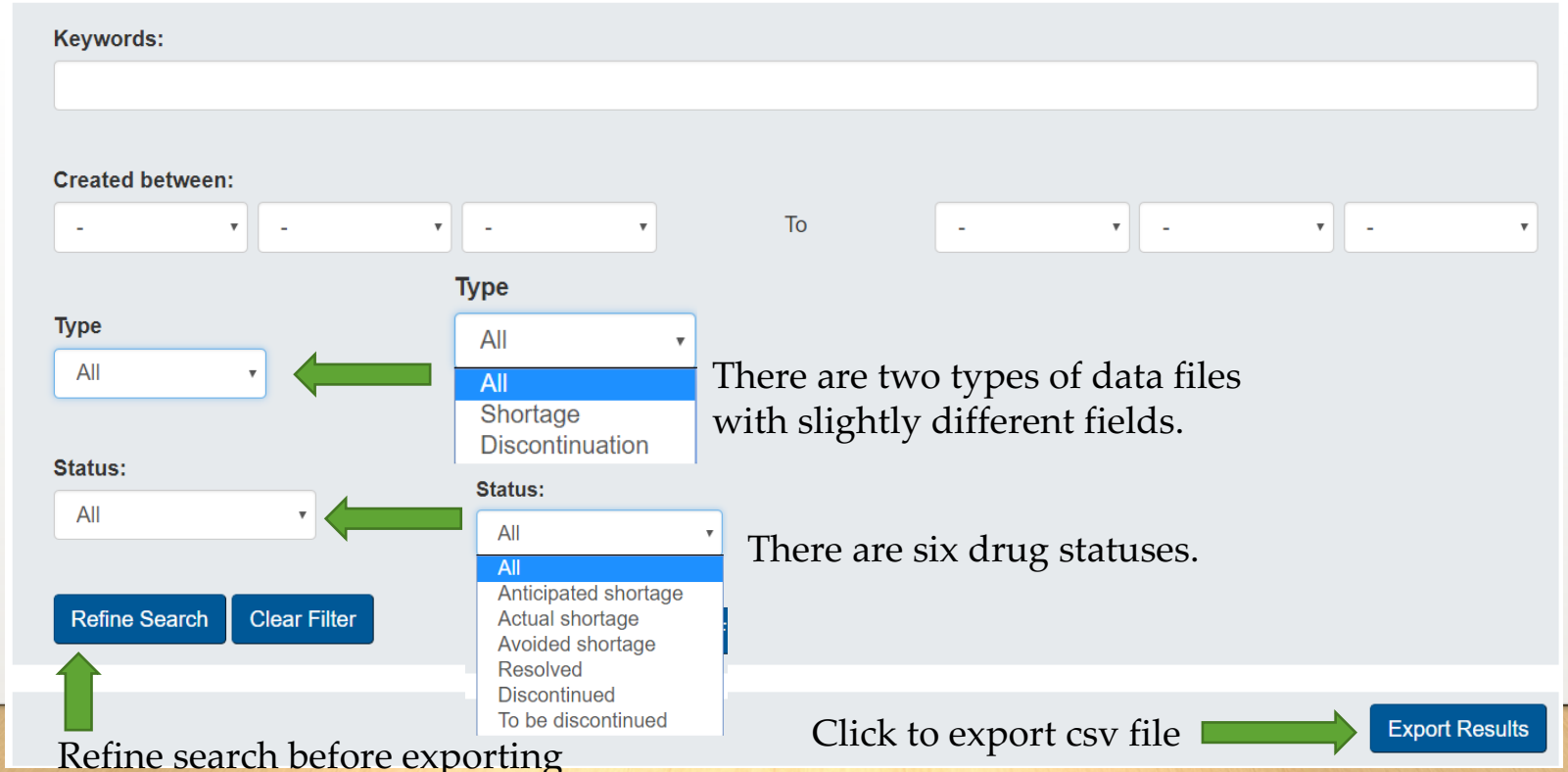
Click here to access data

Search results

Can we automate the download process?

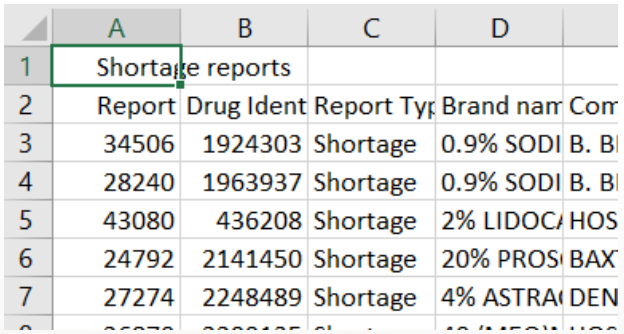
Below you can search for information on drugs that are, or are likely, to go into shortage, or, be discontinued. A drug shortage means a situation in which a company is unable to meet the demand for a product. A discontinuation occurs when a company decides to stop selling a product.

TOGGLE SEARCH FILTERS



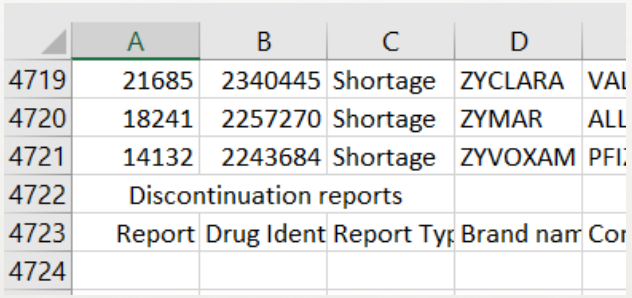
Shortage Data Extracts

Have 1 ‘extra’ line at the top



	A	B	C	D	
1	Shortage reports				
2	Report	Drug Ident	Report Typ	Brand nam	Com
3	34506	1924303	Shortage	0.9% SODI	B. B
4	28240	1963937	Shortage	0.9% SODI	B. B
5	43080	436208	Shortage	2% LIDOC/	HOS
6	24792	2141450	Shortage	20% PROS(	BAX
7	27274	2248489	Shortage	4% ASTRA(	DEN

Have 2 ‘extra’ lines at the bottom

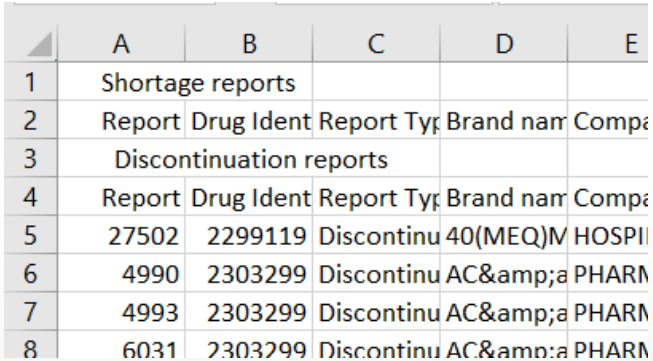


	A	B	C	D	
4719	21685	2340445	Shortage	ZYCLARA	VAI
4720	18241	2257270	Shortage	ZYMAR	ALL
4721	14132	2243684	Shortage	ZYVOXAM	PFI
4722	Discontinuation reports				
4723	Report	Drug Ident	Report Typ	Brand nam	Cor
4724					

Can we automate deleting extra lines?

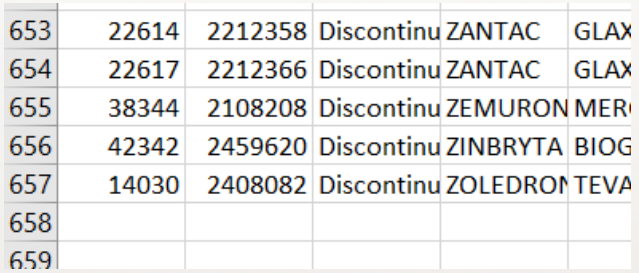
Discontinuation Data Extracts

Have 3 ‘extra’ lines at the top



	A	B	C	D	E
1	Shortage reports				
2	Report	Drug Ident	Report Typ	Brand nam	Compa
3	Discontinuation reports				
4	Report	Drug Ident	Report Typ	Brand nam	Compa
5	27502	2299119	Discontinu	40(MEQ)M	HOSPI
6	4990	2303299	Discontinu	AC&a	PHARM
7	4993	2303299	Discontinu	AC&a	PHARM
8	6031	2303299	Discontinu	AC&a	PHARM

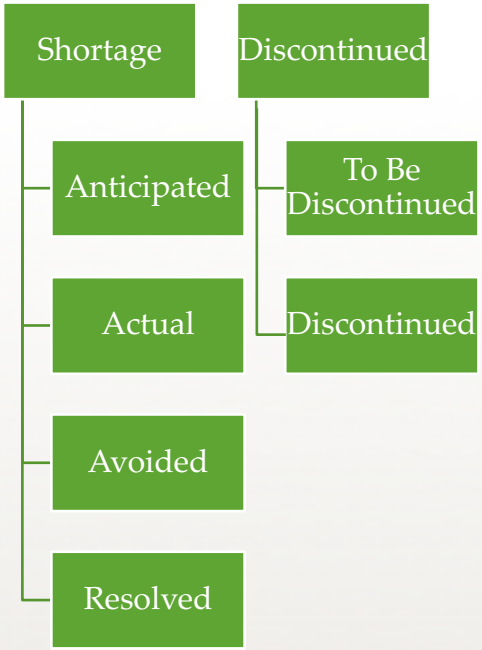
Have no ‘extra’ lines at the bottom



653	22614	2212358	Discontinu	ZANTAC	GLAX
654	22617	2212366	Discontinu	ZANTAC	GLAX
655	38344	2108208	Discontinu	ZEMURON	MER
656	42342	2459620	Discontinu	ZINBRYTA	BIOG
657	14030	2408082	Discontinu	ZOLEDRON	TEVA
658					
659					

Can we automate deleting extra lines?

This is the drug-state information obtained from canadadrugshortages.ca



Data Source #2: The Canadian Drug Product Database

Hyperlink to website

Canadian Drug Product Database

Scroll down to the bottom and select allfiles.zip

ALL FILES	allfiles.zip	2018-04-03
	allfiles_ia.zip	2018-04-03
	allfiles_ap.zip	2018-04-03
	allfiles_dr.zip	2018-04-03

Can we automate the download process?

Extract the files

- comp.txt
- drug.txt
- form.txt
- ingred.txt
- package.txt
- pharm.txt
- route.txt
- schedule.txt
- status.txt
- ther.txt
- vet.txt

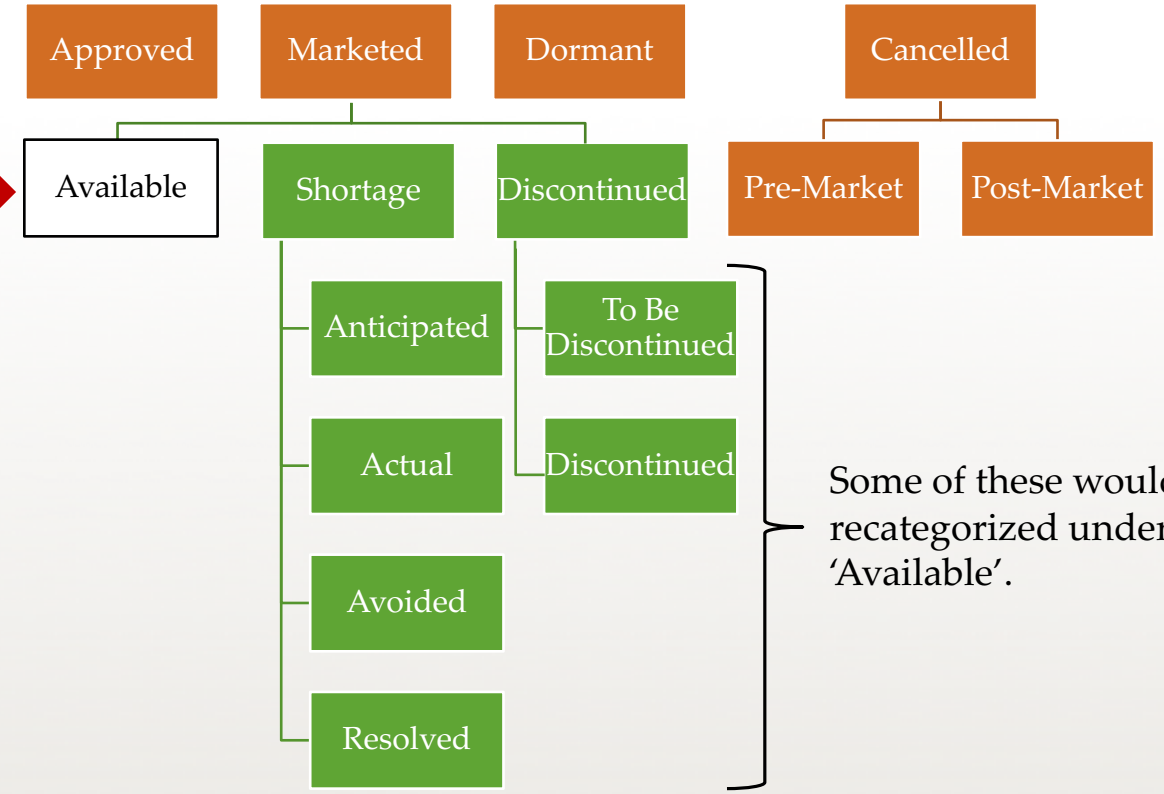
This is the drug-state information obtained from the CDPD

Putting it all together

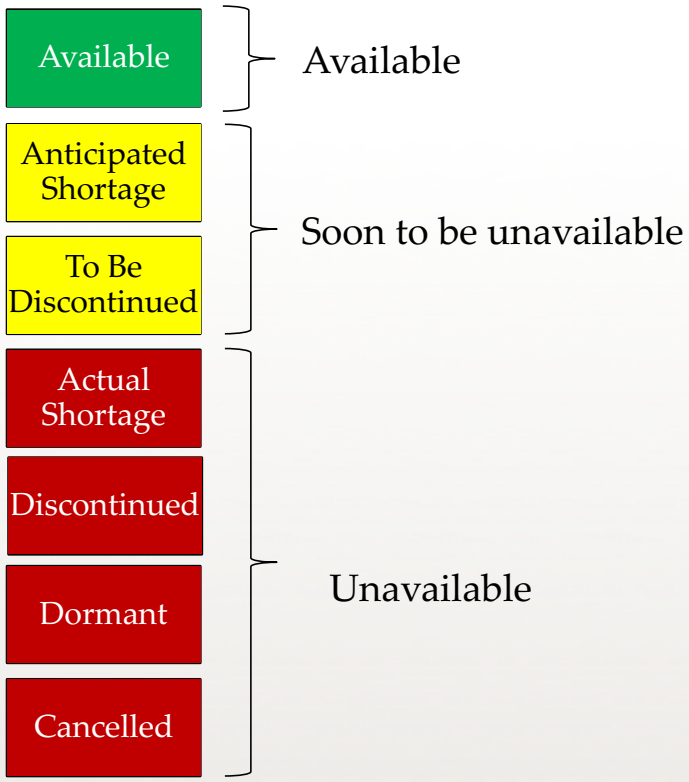
The two data sources identify all possible states

This important state can only be calculated by merging the two data sources together.

THIS is what physicians, pharmacists and patients REALLY need to know.



Group states to better reflect availability



What can be done with the data?

- Build reporting of current availability.
  - Use Tableau public to start but pursue possibility of app development.
  - Find influencers in the pharmaceutical supply chain (pharmacies, hospitals, suppliers) that want to have this capability built in to their systems (because they all currently have flawed information!)
- Build visual analytics to display historical availability. This will help reveal pending shortages.
  - Tableau public to start but pursue possibility of app development.
- Pharmaceutical companies often go in and edit their estimates of shortage durations. Need to build database that captures these changes. Once we have sufficient data over time build KPI to measure the accuracy of pharmaceutical company estimates. Provide reporting on this.
- Build predictive models to provide advanced notice of increased risk of shortages.
  - Tech chosen (SAS or R or Python) may depend on tech decisions made prior to this point.