Appendix 7 Processing the Dispensing Data

222. I received Dispensing Data from Walgreens in San Francisco County, CA. Each line of the Dispensing Data contains basic information about the prescriber, the dispensed drug, the dispensed quantity, the dispensing pharmacy and the patient receiving the prescription. Also provided are the date and time when the prescription was filled and the date when the prescription was written. The data range with respect to prescription filling time is January 2006-June 2020 for Walgreens.

223. The Dispensing Data provided by Walgreens includes prescriptions on 9 opioid molecules: oxycodone, morphine, hydrocodone, fentanyl, hydromorphone, oxymorphone, tapentadol, codeine and methadone. The Dispensing Data also reflects benzodiazepine and muscle relaxer prescriptions dispensed to any patient who also received an opioid prescription whenever the benzodiazepine or muscle relaxer prescription was dispensed within 14 days of the opioid prescription.

224. The following is a list of fields provided by Walgreens that are most relevant to the identification of red flags of diversion.

1) The product name of the dispensed drug, for example, "HYDROCODONE/APAP 5MG/500MG TABS" or "OXYCONTIN 10MG TABLETS".

2) National Drug Code (NDC) number of the dispensed drug.

3) The date when the prescription was filled by the pharmacy.

4) Dispense time of the prescription.

5) Quantity dispensed. This is the dosage units of the drug dispensed.

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6) Days of supply. This reports the number of days the prescription is intended to last for.

7) Number of refills authorized. This is the maximum number of refills allowed.

8) Refill indicator. This field is binary indicating refill or not.

9) Method of payment. This indicates whether the prescription was paid for by the patient with cash or by a third-party payer.

10) The date when the prescription was written by the prescriber.

11) Quantity prescribed. This is the dosage units of the drug prescribed.

12) Prescriber DEA number.

13) Prescriber National Provider Identifier (NPI) number.

14) Prescriber's full name.

15) Prescriber's zip code.

16) Pharmacy's DEA number.

17) Pharmacy's store number.

18) Pharmacy's zip code.

19) Dispensing pharmacist's identifier.

20) Patient identifier.

21) Patient's zip code.

22) Patient's birth year.

225. I identify the following data elements from external sources for each NDC number in the Dispensing Data and append them to the raw data.

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Our sources include the public NDC directory downloaded from the DEA's website and an internal NDC drug dictionary.

23) Drug type. This indicates whether the dispensed drug is an opioid, benzodiazepine or muscle relaxer.

24) Base drug. This indicates the molecule of the drug dispensed, for example, "hydrocodone", "alprazolam" or "carisoprodol".

25) Drug form. This indicates the dosage form of the drug dispensed, for example, "tablet", "capsule" or "patch".

26) Drug schedule. This indicates the DEA schedule of the drug dispensed and takes a value of either 2 (schedule II), 3 (schedule III), 4 (schedule IV) or N/A (non-controlled).

27) Dosage strength. This is the numerical strength of the dispensed base drug as described in the drug name, expressed in milligram (for tablets and capsules), milligram per milliliter (for liquid products) or milligram per hour (for patches). For example, the dosage strength field is equal to 5 for the drug "Oxycodone / Acetaminophen Tab 5-325 MG", 2 for "Morphine Sulfate Oral Solution 10 MG/5ML" and 0.1 for "Fentanyl TD Patch 72HR 100 MCG/HR".

28) Brand name indicator. This is a dummy variable equal to 1 for brand name drugs and 0 otherwise.

29) ER indicator. This is a dummy variable equal to 1 for extended-release and controlled-release drugs and 0 otherwise.

30) Morphine Milligram Equivalent (MME) for opioid prescriptions. This is calculated as multiplying the dispensed dosage units by dosage

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strength and then by a MME conversion factor unique to each opioid molecule.

226. I also calculate the distances between patients and prescribers, patients and pharmacies and pharmacies and prescribers, and append these distances to each prescription in the Dispensing Data. The distances are geodesic distances between the coordinates of the centers of the 5-digit zip codes.

Appendix 8 ARCOS Overview

227.   This appendix summarizes opioid shipment transactions reported in the ARCOS Data by drug, by reporter's business activity, by buyer's business activity, and by year for California and all its counties. Based on Retail Drug Summary Report, it also summarizes the opioid shipment before 2006 and after 2014.

Appendix 9 Distributor Appendix

228.   This appendix summarizes Distributor market share on 12 opioid drugs from 2006 to 2014 and Distributor Defendant opioid shipments into San Francisco, CA. It also shows the result of implementing various methodologies described in Section VII to identify transactions in San Francisco County, CA meeting specified criteria using the non-public ARCOS Data from 2006 to 2014, supplemented with Distributor Defendant Transactional Data.

Appendix 10 Chain Pharmacy Appendix

229.   This appendix contains the pharmacy reports, summarizing opioid purchase by each retail and chain pharmacy in San Francisco, CA from 2006 to 2014. It also shows the result of implementing various methodologies described in Section VII to identify Walgreens pharmacy purchases in California meeting specified criteria using the non-public ARCOS Data from 2006 to 2014.

230. This appendix summarizes Walgreens Dispensing Data and the results of applying certain "flagging" algorithms to Walgreens Dispensing Data.

Appendix 11 Manufacturer Appendix

231. This appendix summarizes the Manufacturer Defendant market share in San Francisco, CA based on Manufacturer Defendant NDC codes. It also summarizes the result of implementing various methodologies described in Section XIII and XIV to identify transactions in San Francisco County, CA meeting specified criteria using the non-public ARCOS Data from 2006 to 2014.