# BLUESIGHT
## CONTROLLED SUBSTANCES

# 2022 DIVERSION TRENDS REPORT

## AN ANALYSIS OF DRUG DIVERSION EVENTS & INVESTIGATIONS

# INTRODUCTION

**Bluesight™ for Controlled Substances** is a top-ranked drug diversion management software from Kit Check, leveraged by over 230 hospitals. In this report, Kit Check is sharing data from our drug diversion platform to provide insight into the types of diversions and investigations that may be occurring in hospitals. In developing this report, we analyzed over 2 years' worth of data, including over 50M controlled substance medication transactions, to highlight important learnings and emerging trends. The following information is as of December 31st, 2021. Data was pulled from health systems across the United States.

Kit Check's **Bluesight™ for Controlled Substances** is the only solution on the market that provides a 100% audit of controlled substances doses throughout their entire clinical lifecycle, from the wholesaler to the pharmacy, all the way to the patient care area, and the patient's Electronic Medical Record.

The platform's reconciliation engine conducts closed-loop dose reconciliation and traces every dispense through the corresponding administrations, waste, and/or return events to ensure that the full volume dispense is accounted for across all documentation systems, care providers, and handoffs. This report is based on data that is generated and collected during the reconciliation process.

# CONTENTS

# KEY THEMES

## THEME 1

### VARIANCE TRACKING HAS IMPROVED ACCURACY

Compared to early 2020, Bluesight is tracking more than double the number of variances on a quarterly basis, while reducing the review workload by 33%.

## THEME 2

### OVER HALF OF VARIANCES ARE UNRECONCILED

While hospitals have gradually reduced the share of open, discrepant cases, only 46% have been reviewed and marked as reconciled / non-diversion event.

## THEME 3

### PRIORITIZING INVESTIGATIONS

Hospitals are conducting 2x more investigations vs. two years ago, and these investigations take an average of +11 days longer to resolve.
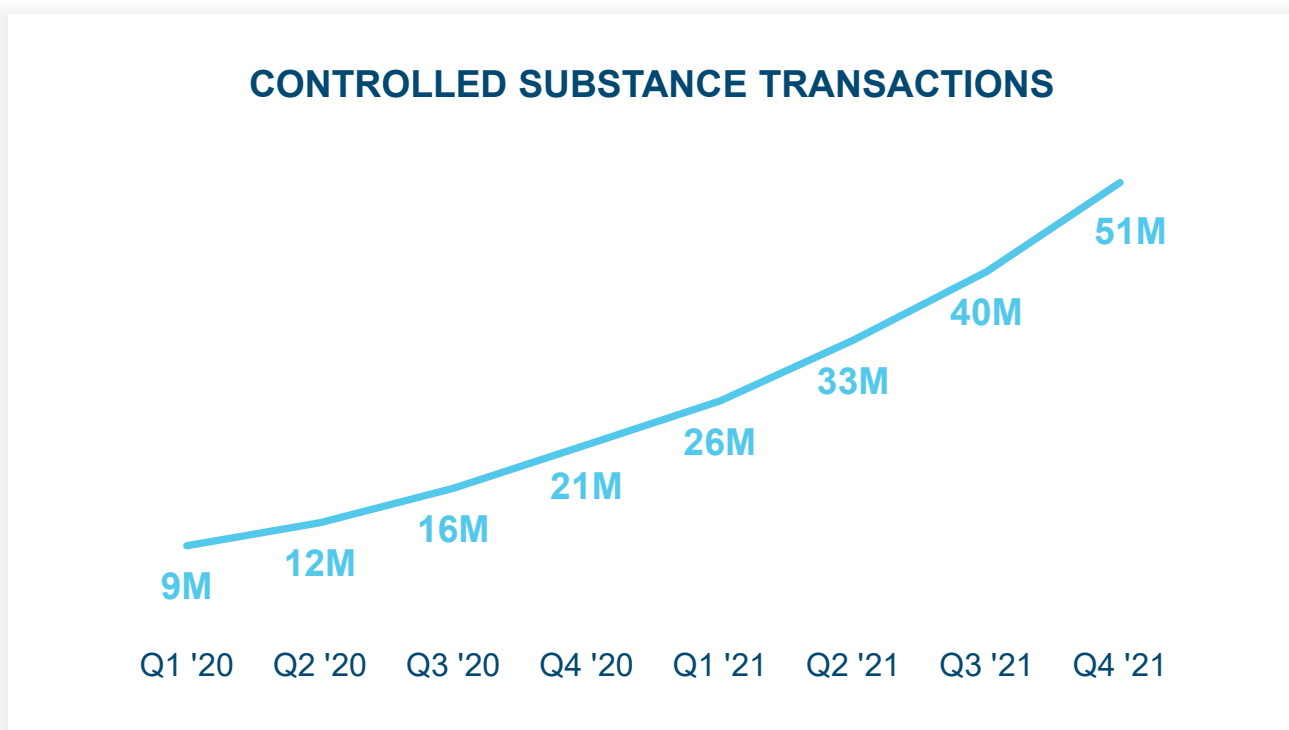
## THEME 4

### SOURCES OF VARIANCES

Over 2+ years of quarterly data, the largest share of discrepancies consistently involved fentanyl and midazolam.

# IN 2+ YEARS, WE'VE TRACKED 51M CONTROLLED SUBSTANCE TRANSACTIONS

Since the inception of Bluesight™ for Controlled Substances in September 2018, over 50M controlled substance medications have been tracked by the platform. This is based on drug diversion monitoring in over 230 hospitals, including over 50,000 hospital beds and 2,000 operating rooms. Each quarter, Bluesight™ for Controlled Substances collects data on an average of 6M controlled substance transactions.

**51M** controlled substance transactions

## CONTROLLED SUBSTANCE TRANSACTIONS

| Quarter | Value |
|---------|-------|
| Q1 '20 | 9M |
| Q2 '20 | 12M |
| Q3 '20 | 16M |
| Q4 '20 | 21M |
| Q1 '21 | 26M |
| Q2 '21 | 33M |
| Q3 '21 | 40M |
| Q4 '21 | 51M |

# 8% OF ALL CONTROLLED SUBSTANCE TRANSACTIONS WERE DISCREPANT

Among the 51M medication transactions that have been tracked by Bluesight™ for Controlled Substances, 8% (4M) were flagged as a potential variance. A variance is a discrepancy identified between a medication order and usage and disposal of the medication. These variances represent a potential instance of diversion or gaps in documentation, which can often require further review. The remaining 92% of transactions were automatically closed with all dispense medication accounted for.
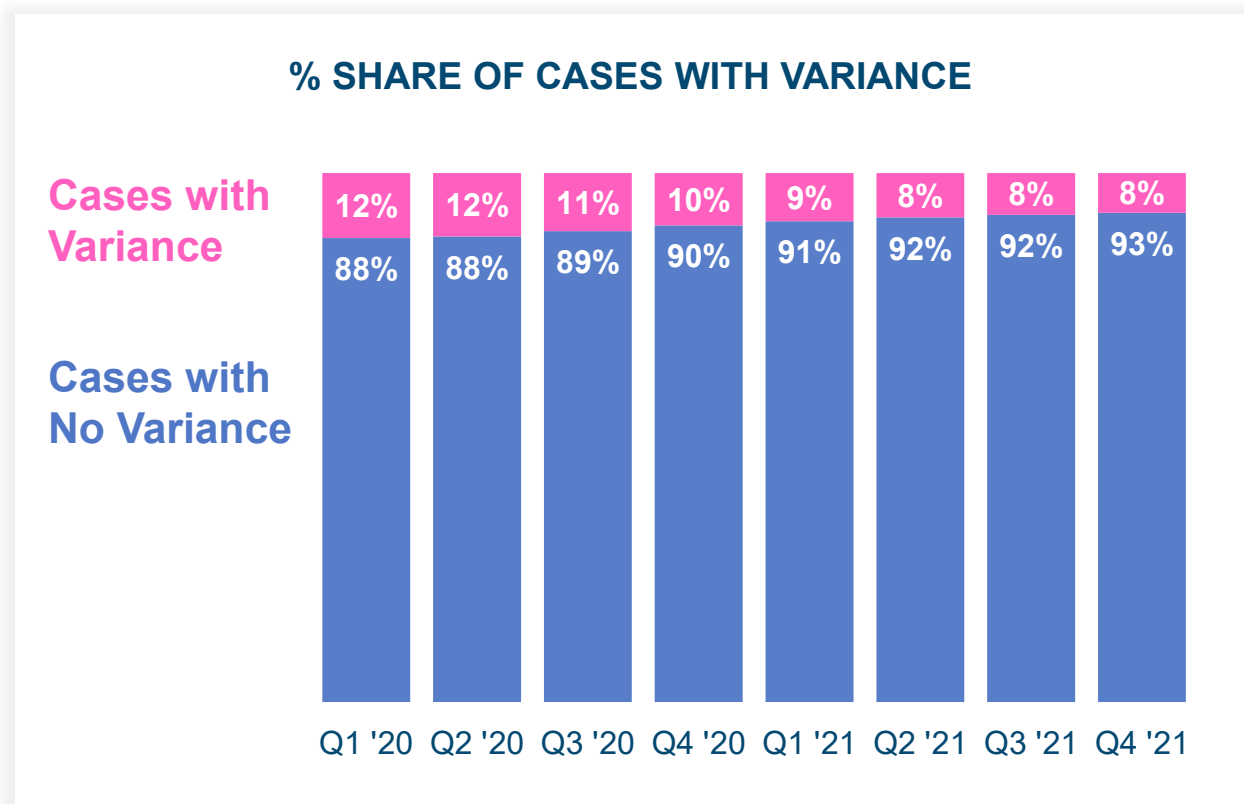
## 4M discrepant medication transactions identified

### TOTAL CASES BY STATUS (SEP 2018 – DEC 2021)

8% **Cases with Variance**

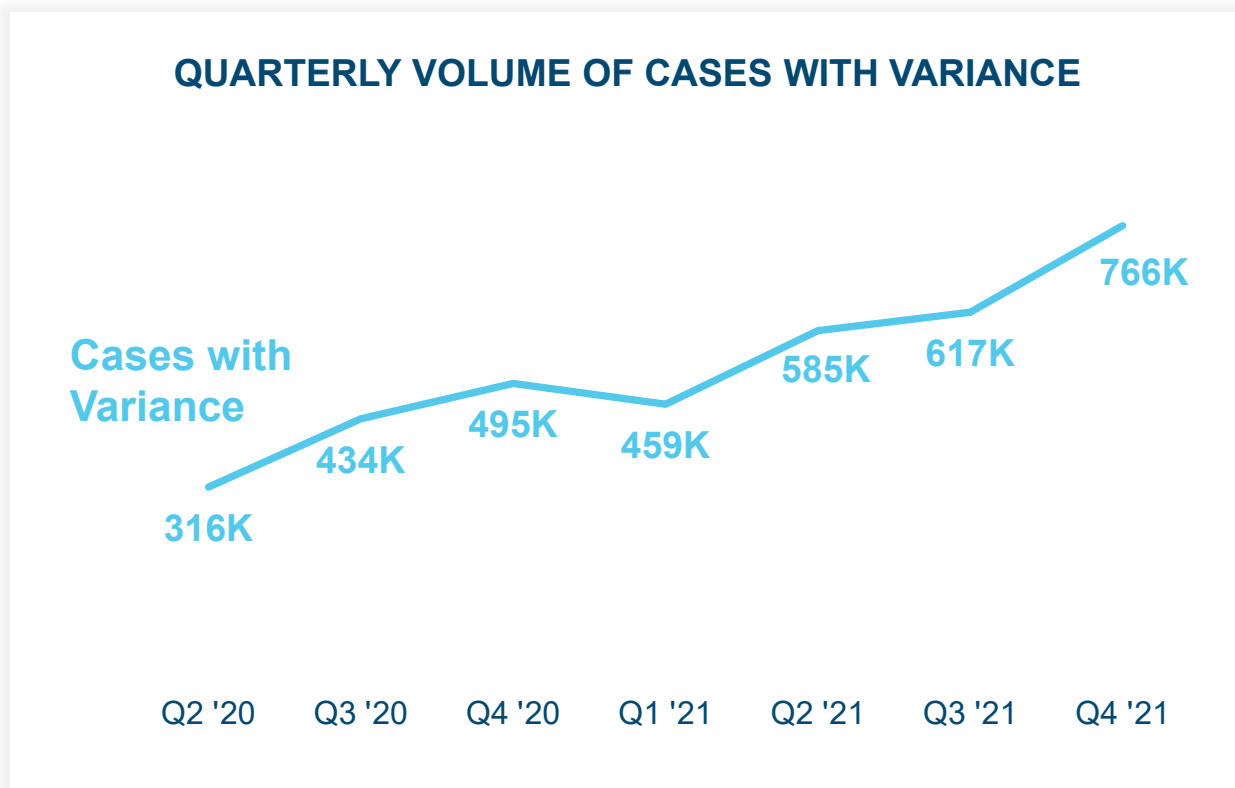92% **Transactions with all medication accounted for**
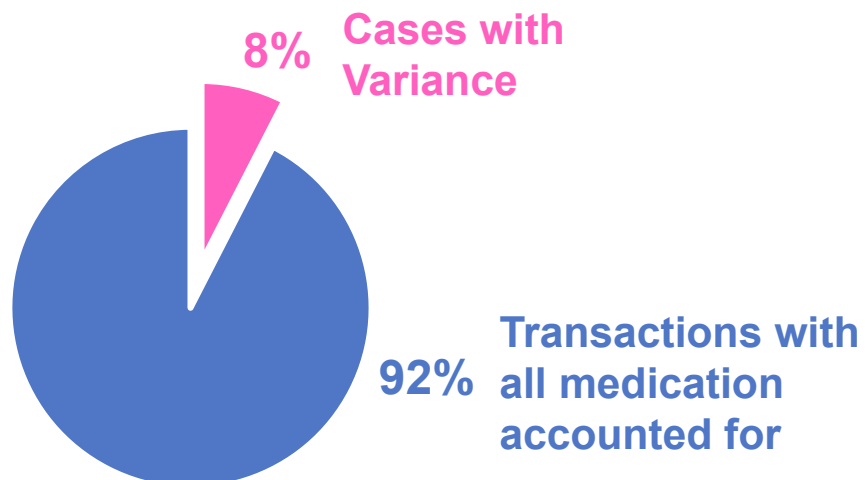
# THE SHARE OF DISCREPANT TRANSACTIONS HAS GRADUALLY IMPROVED

Over the past 2+ years, Kit Check has observed a gradual decrease in the percentage of controlled substance medication transactions that were flagged with a potential variance. In Q1 2020, 12% of all cases included a discrepancy between the medication dispensed and the medication administered, disposed, or returned. By Q4 2021, this percentage decreased to 8%. This is due to both hospitals improving documentation compliance rates, as well as Bluesight™ for Controlled Substances improving its ability to identify true discrepancies.

## % SHARE OF CASES WITH VARIANCE

**Cases with Variance**

**Cases with No Variance**

| | Q1 '20 | Q2 '20 | Q3 '20 | Q4 '20 | Q1 '21 | Q2 '21 | Q3 '21 | Q4 '21 |
|---|---|---|---|---|---|---|---|---|
| Cases with Variance | 12% | 12% | 11% | 10% | 9% | 8% | 8% | 8% |
| Cases with No Variance | 88% | 88% | 89% | 90% | 91% | 92% | 92% | 93% |

# THOUGH, THE VOLUME OF CASES WITH VARIANCES IS ON THE RISE

As the number of hospitals using Bluesight™ for Controlled Substances grows and the number of transactions processed by Bluesight increases, the *volume of cases with variances* is on the rise. Due to the growing dataset, we observed an increase in the volume of cases, even as the *percentage of cases with variances* trends downward.

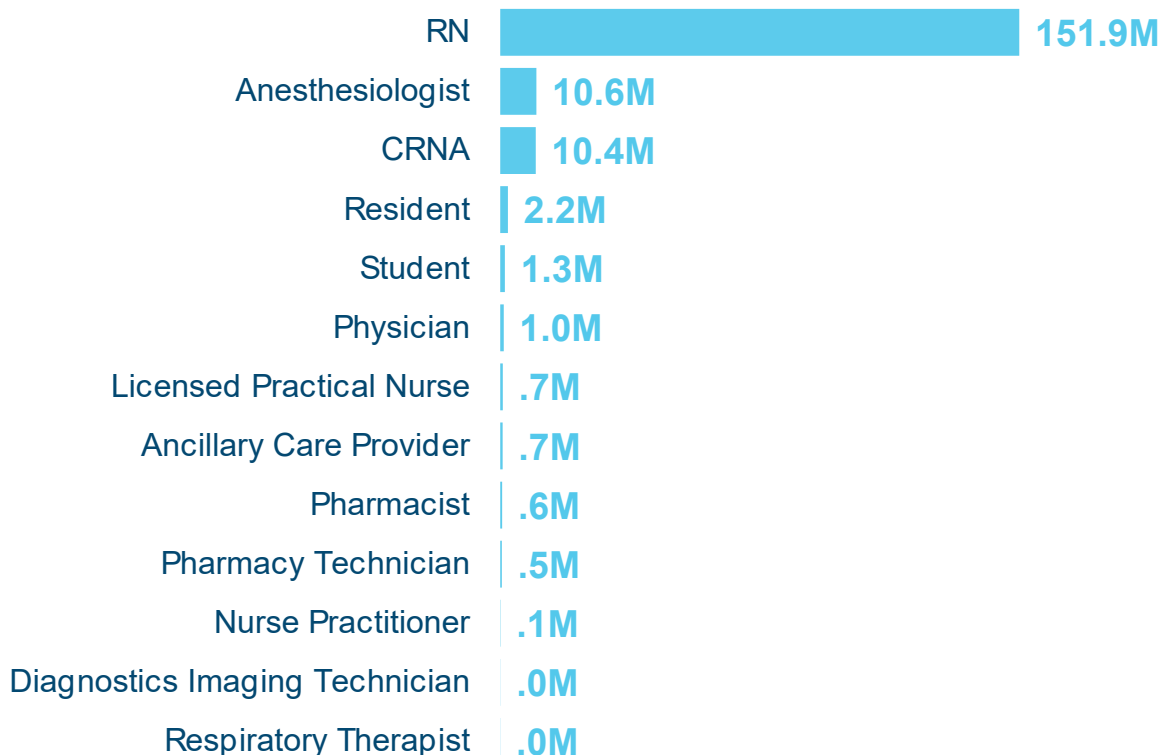**QUARTERLY VOLUME OF CASES WITH VARIANCE**

**Cases with Variance**

316K
434K
495K
459K
585K
617K
766K

Q2 '20    Q3 '20    Q4 '20    Q1 '21    Q2 '21    Q3 '21    Q4 '21

*Excludes Q1 2020 as it represented more than one quarter's worth of data

# AMONG HOSPITAL STAFF, DISCREPANCIES MOST OFTEN INVOLVED RNs

Since the launch of Bluesight™ for Controlled Substances, most discrepancies were generated by RNs. Anesthesiologists and CRNAs followed at a distant 2nd and 3rd. This is largely attributed to the overall transactions involving RNs. This does not mean RNs have a higher rate of variances than other roles.

## 84% of all discrepant medication transactions involved an RN

### DISCREPANCIES BY ROLE (SEP 2018 – DEC 2021)

| Role | Discrepancies |
|------|--------------|
| RN | 151.9M |
| Anesthesiologist | 10.6M |
| CRNA | 10.4M |
| Resident | 2.2M |
| Student | 1.3M |
| Physician | 1.0M |
| Licensed Practical Nurse | .7M |
| Ancillary Care Provider | .7M |
| Pharmacist | .6M |
| Pharmacy Technician | .5M |
| Nurse Practitioner | .1M |
| Diagnostics Imaging Technician | .0M |
| Respiratory Therapist | .0M |

# 9% OF DISCREPANT CASES COULD NOT BE RESOLVED WHEN REVIEWED

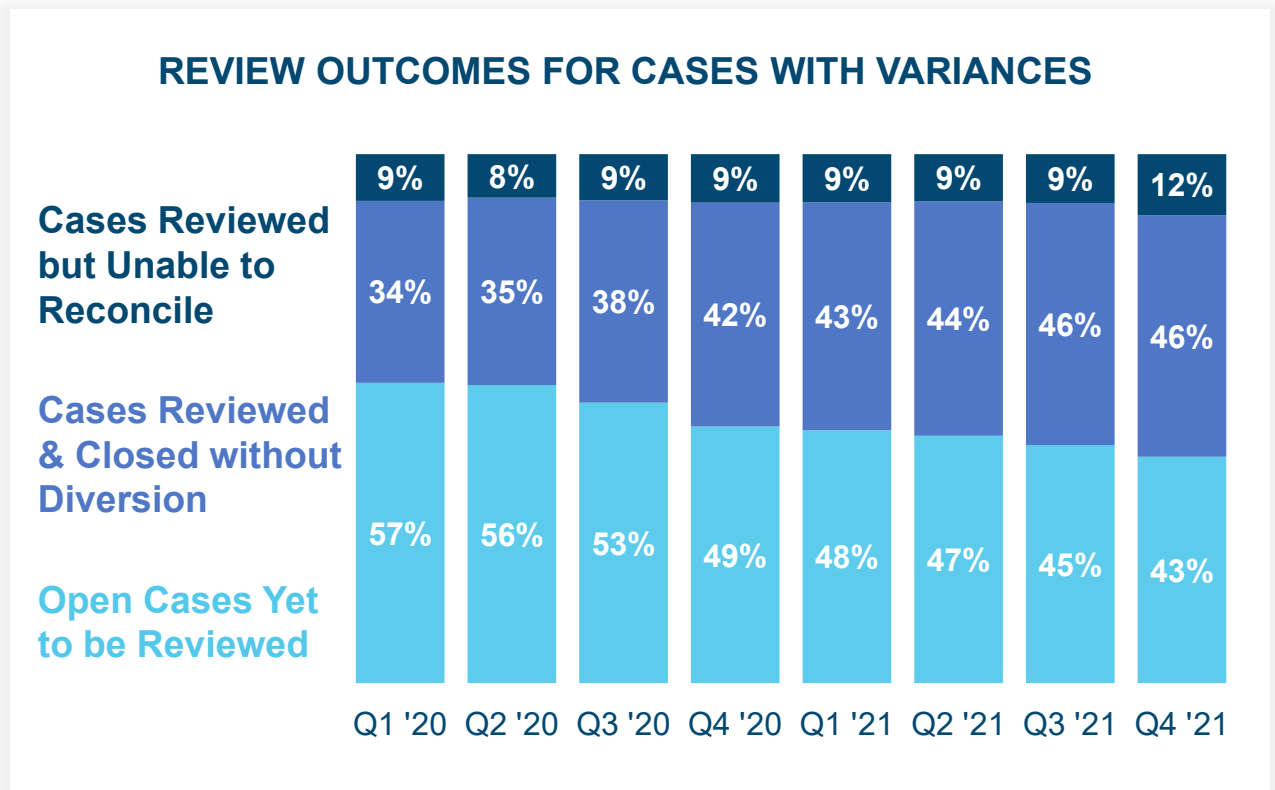As we observed earlier in this report, 8% of all controlled substance medication transactions included discrepancies between the medication dispensed and the medication administered. Among these discrepant transactions, 9% of cases have been reviewed and were marked as unable to be reconciled. In these instances, further investigation may be warranted as a diversion event may have caused the variance. Another 46% of cases were reviewed and closed, ruling out diversion as a contributing factor. The remaining 45% of cases remain open, as they're yet to be reviewed.

**REVIEW OUTCOMES FOR CASES WITH VARIANCES
(SEP 2018 – DEC 2021)**

**9%
Cases Reviewed but
Unable to Reconcile**

**46%
Reviewed and
Closed**

**45%
Open Cases Yet
to be Reviewed**
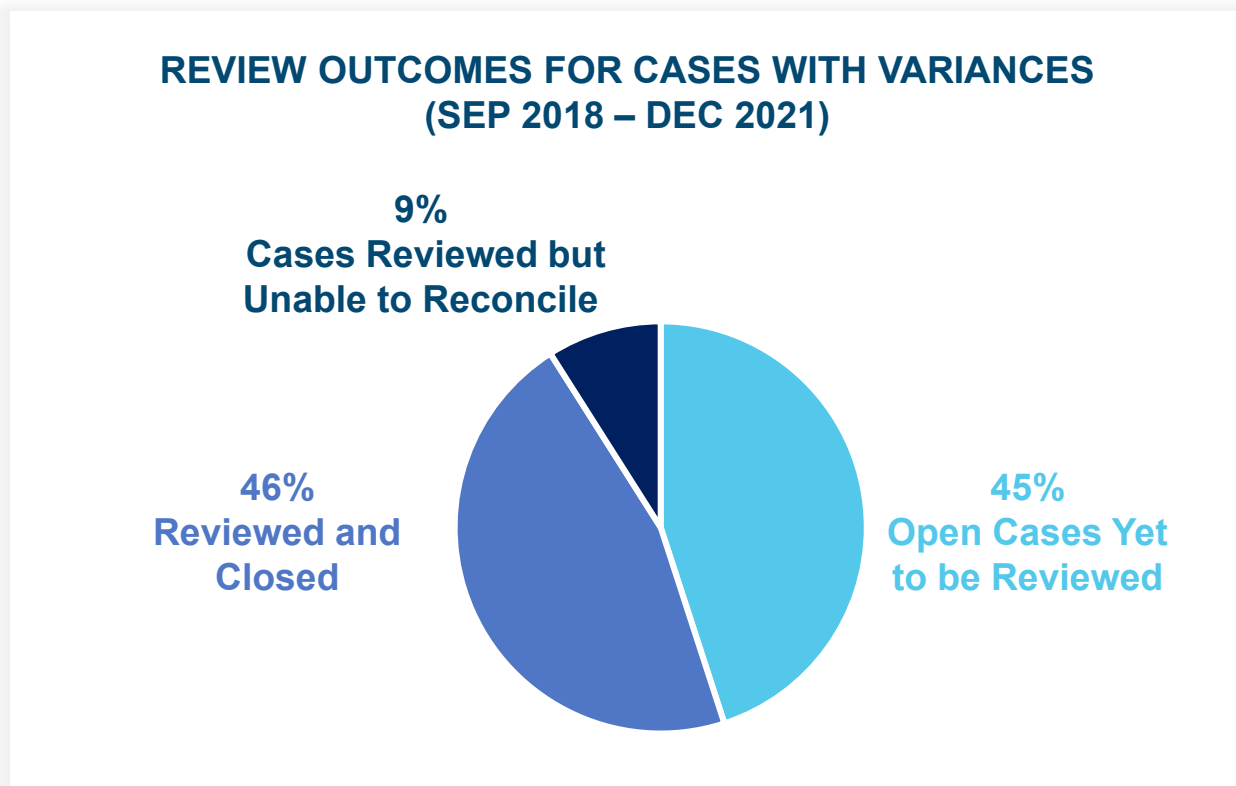
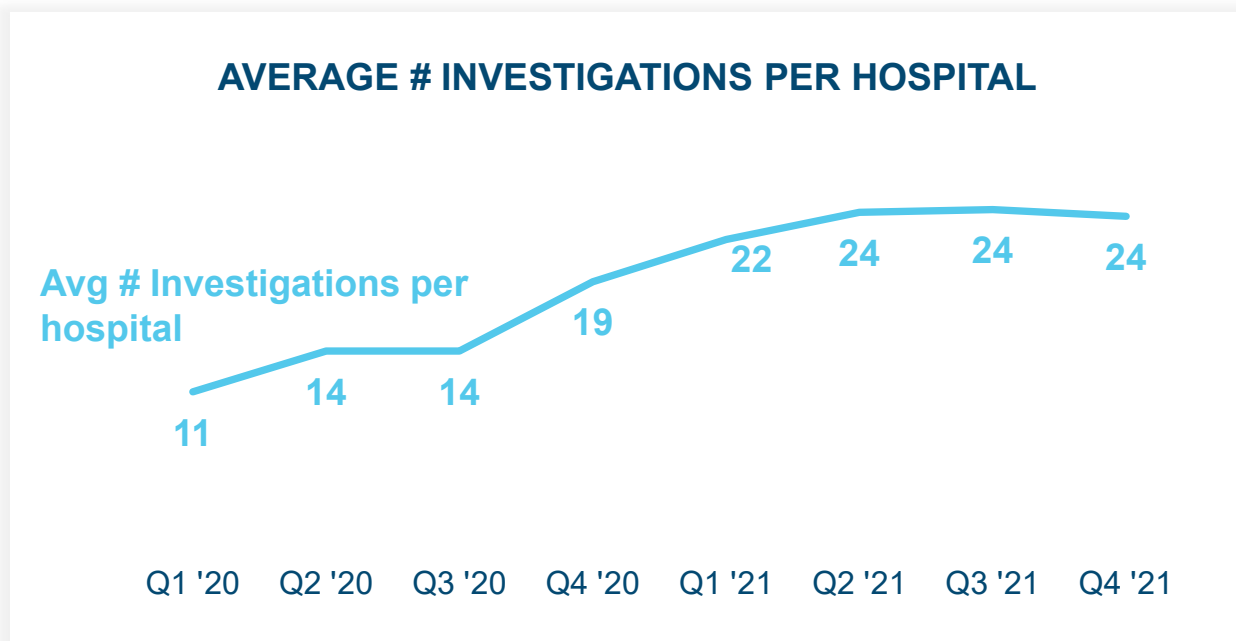# IN Q4 2021, THE SHARE OF UNRECONCILABLE CASES INCREASED +33% QoQ

Over the past 2+ years, as more cases with variances were reviewed, the percentage of open cases has steadily declined, falling from 57% to 43% across the measured time period. Most of the reviewed cases were closed without any indication that drug diversion played a role in the discrepancy. This trend is indicated by the growing bars in the chart below. For much of the past two years, the share of cases that were reviewed but were unable to be reconciled held steady at 9%. In Q4 2021, however, the percentage of unreconcilable cases increased to 12%.

## REVIEW OUTCOMES FOR CASES WITH VARIANCES

| | Q1 '20 | Q2 '20 | Q3 '20 | Q4 '20 | Q1 '21 | Q2 '21 | Q3 '21 | Q4 '21 |
|---|---|---|---|---|---|---|---|---|
| **Cases Reviewed but Unable to Reconcile** | 9% | 8% | 9% | 9% | 9% | 9% | 9% | 12% |
| **Cases Reviewed & Closed without Diversion** | 34% | 35% | 38% | 42% | 43% | 44% | 46% | 46% |
| **Open Cases Yet to be Reviewed** | 57% | 56% | 53% | 49% | 48% | 47% | 45% | 43% |

# THE AVERAGE HOSPITAL IS CONDUCTING TWICE AS MANY INVESTIGATIONS

When there is a variance that can not be reconciled by a review, further investigation is often required to determine if a case of diversion has occurred. The effort made by hospitals to review and close out their open, discrepant cases is made evident by the upward trend shown below. Since Q1 2020, the average number of investigations per hospital has more than doubled, increasing from 11 to 24.

**2x** the average number of investigations per hospital more than doubled since Q1 2020

## AVERAGE # INVESTIGATIONS PER HOSPITAL

**Avg # Investigations per hospital**

11  14  14  19  22  24  24  24

Q1 '20   Q2 '20   Q3 '20   Q4 '20   Q1 '21   Q2 '21   Q3 '21   Q4 '21

# AS HOSPITALS OPEN MORE INVESTIGATIONS, THEY'RE TAKING LONGER TO RESOLVE

Completed investigations often require over 30 days to resolve. Over the past 2+ years, we've observed a sizeable increase in the average number of days required to resolve an investigation. The increase from 26 days in Q2 2020 to 33 days in Q3 2020, the largest quarter-over-quarter increase we have observed, could be attributed to staffing issues due to Covid-19. At the start of 2020, the average investigation was closed in 23 days. By the end of 2021, the average number of days increased to 34, representing the highest quarterly average we've observed to date.

**+11 DAYS** the increase in average number of days required to resolve an investigation

## AVG NUMBER OF DAYS TO RESOLVE AN INVESTIGATION

Avg # of days

23 — 26 — 33 — 30 — 30 — 28 — 28 — 34

Q1 '20  Q2 '20  Q3 '20  Q4 '20  Q1 '21  Q2 '21  Q3 '21  Q4 '21
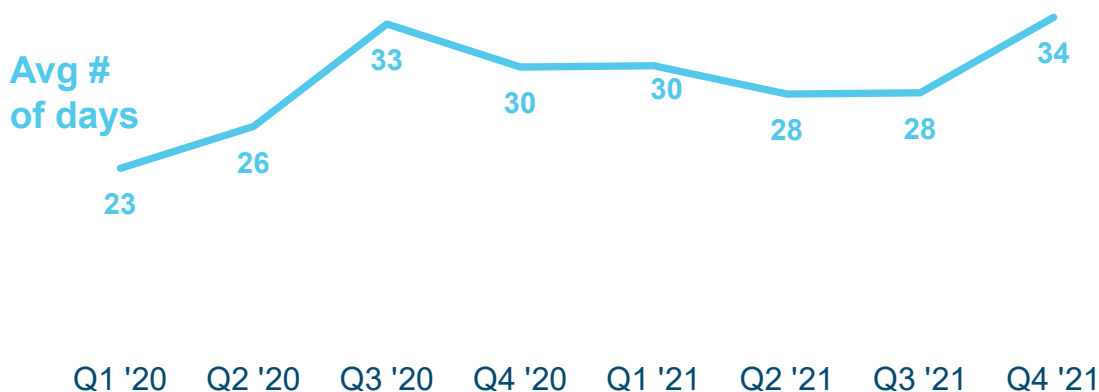
# HIGHEST RATES OF DIVERSION FOUND AMONG INVESTIGATIONS OPENED BY COLLEAGUES AND PATIENT REPORTING

Having a system in place where people feel comfortable reporting possible cases of diversion is crucial. A third of all investigations based on colleague and patient reports have resulted in a confirmed case of diversion. Additionally, investigations opened based on specific analytics data highlighted by Bluesight for Controlled Substances are 4x more likely to result in confirmed diversion compared with investigations opened as part of routine surveillance.

The chart below shows the counts of investigations based on the reason selected for starting the investigation.

| Open Reason | Investigations | Percent Confirmed | Average Days to Investigate |
|---|---|---|---|
| Patient/ Colleague Reported | 112 | 36.6 | 40.8 |
| Routine Surveillance* | 2293 | 1.4 | 20.0 |
| Bluesight Data** | 1873 | 5.6 | 38.0 |

*Routine Surveillance refers to when hospitals review their top providers in the application on a regular basis. These investigations are still based on Bluesight analytics, but there wasn't a specific reason for the investigation.
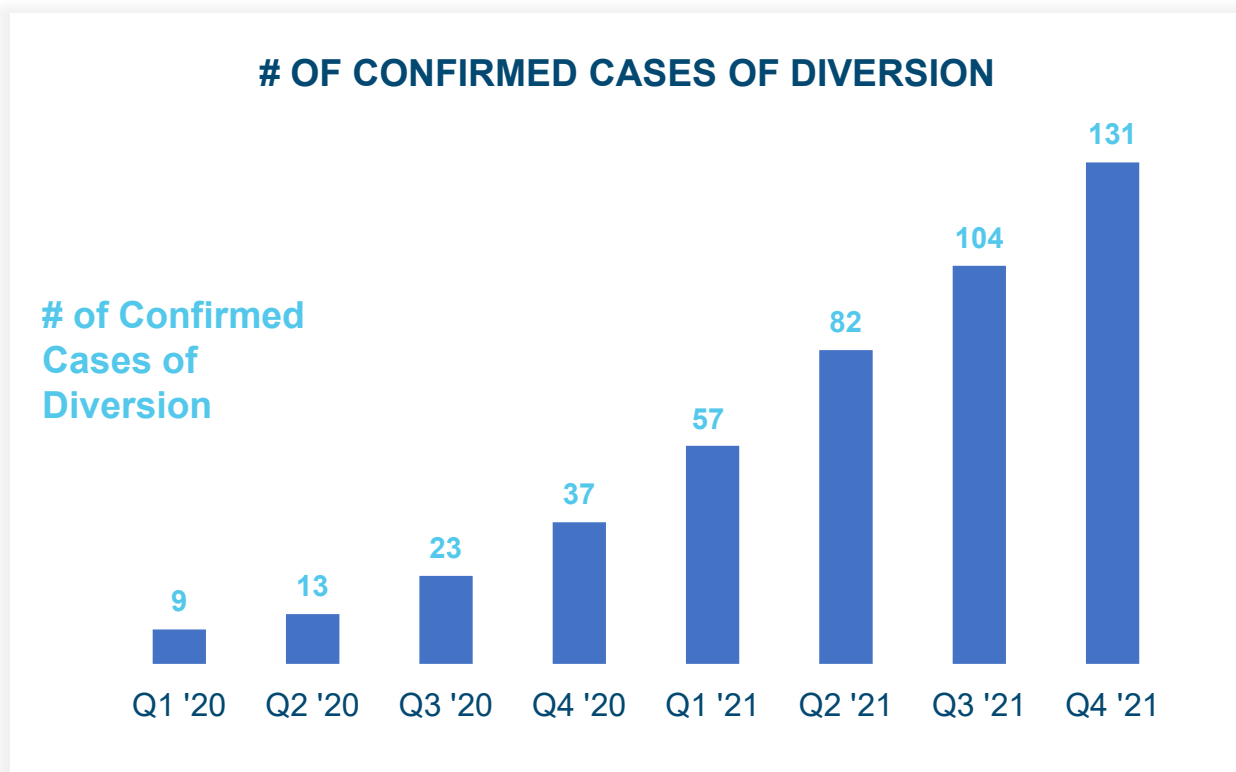
**Bluesight Data refers to when hospitals open an investigation specifically because of something flagged by the application.

# HOSPITALS HAVE IDENTIFIED 131 CONFIRMED CASES OF DIVERSION

By using Bluesight™ for Controlled Substances as a drug diversion monitoring solution, hospitals have identified 131 confirmed cases of diversion. Confirmed cases of diversion are defined here as those that have either been reported externally or faced disciplinary action at the close of an investigation.

**131** confirmed cases of diversion have been identified using Bluesight™ for Controlled Substances

**# OF CONFIRMED CASES OF DIVERSION**

# of Confirmed Cases of Diversion

| Q1 '20 | Q2 '20 | Q3 '20 | Q4 '20 | Q1 '21 | Q2 '21 | Q3 '21 | Q4 '21 |
|--------|--------|--------|--------|--------|--------|--------|--------|
| 9 | 13 | 23 | 37 | 57 | 82 | 104 | 131 |

*These numbers are cumulative confirmed cases based on data reported to Bluesight for Controlled Substances in the application. These numbers do not include cases reported to third parties, and many cases go unreported to our teams.

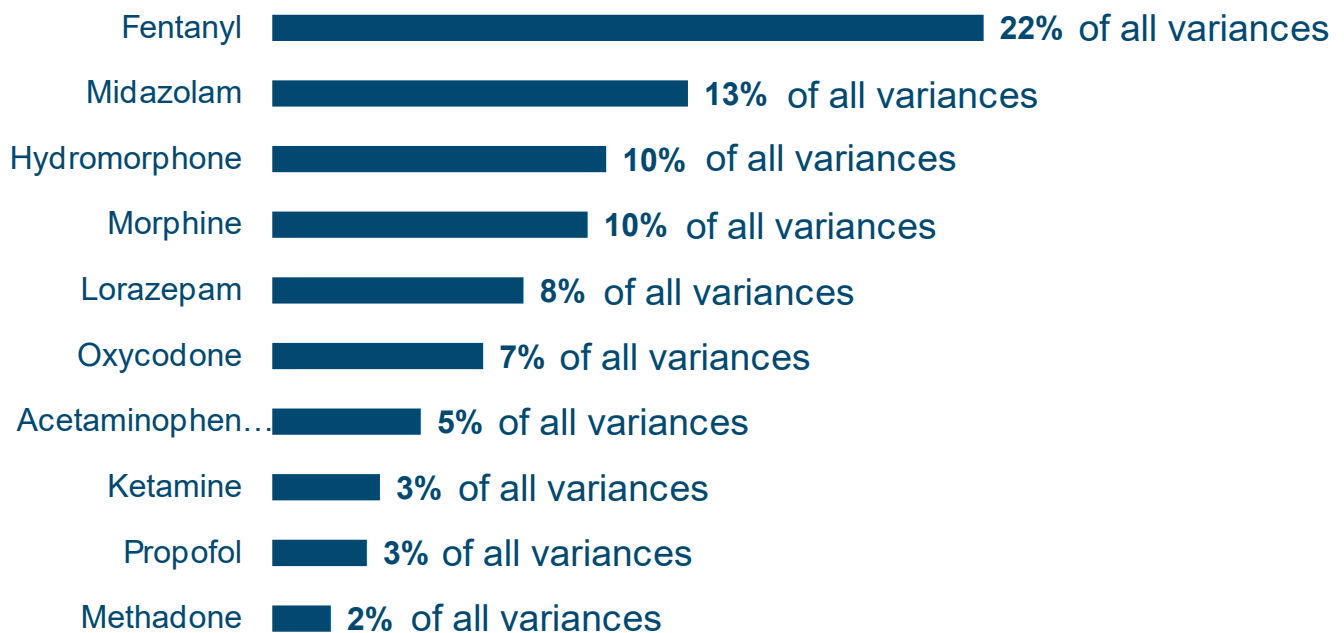# FENTANYL ACCOUNTED FOR THE LARGEST SHARE OF CASES WITH VARIANCES

When comparing across controlled substance medications, Fentanyl has accounted for the largest share of discrepant medication transactions. In fact, since September 2018, Fentanyl accounted for 22% of all cases with variances. Midazolam followed at a distant 2nd, representing 13% of all cases.

**NEARLY**

**1 in 4** cases with variances over the past 2+ years involved Fentanyl

## TOP 10 DRUGS WITH VARIANCES (SEP 2018 – DEC 2021)

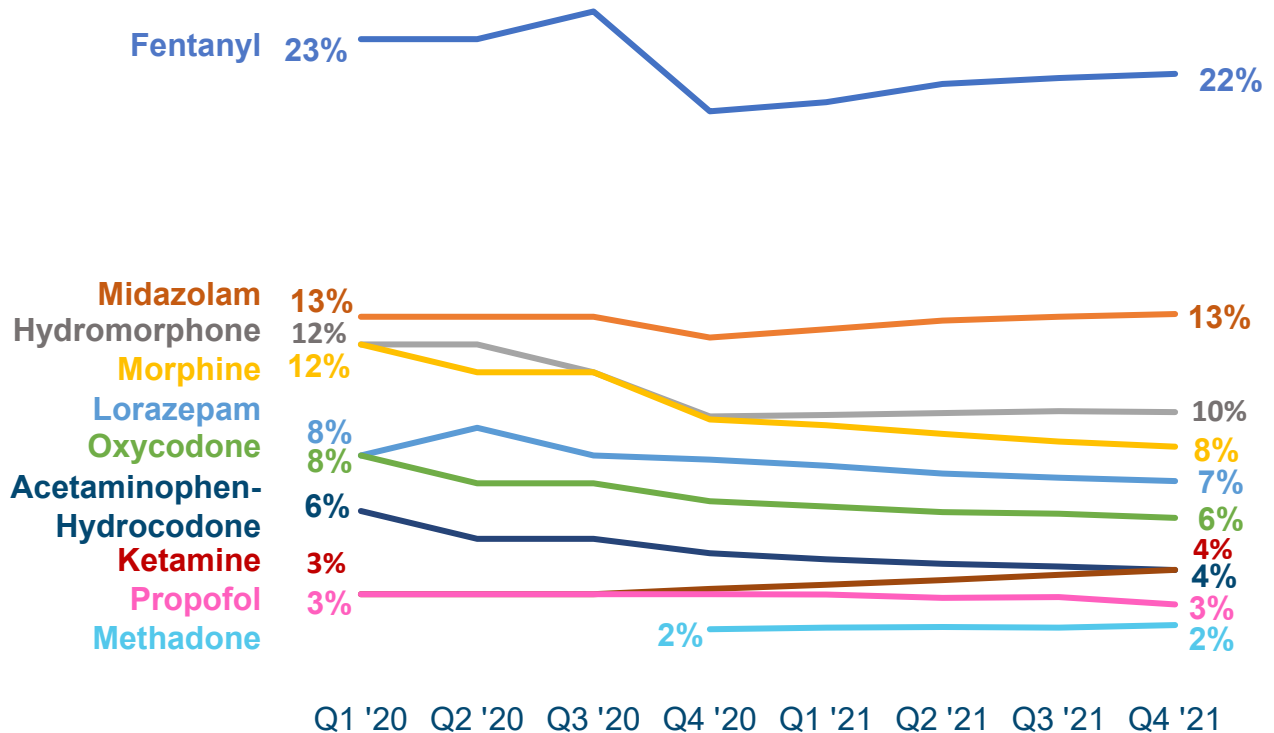| Drug | |
|---|---|
| Fentanyl | **22%** of all variances |
| Midazolam | **13%** of all variances |
| Hydromorphone | **10%** of all variances |
| Morphine | **10%** of all variances |
| Lorazepam | **8%** of all variances |
| Oxycodone | **7%** of all variances |
| Acetaminophen… | **5%** of all variances |
| Ketamine | **3%** of all variances |
| Propofol | **3%** of all variances |
| Methadone | **2%** of all variances |

*Excludes "Other" drugs

# THE SHARE OF VARIANCES BY DRUG HAS HELD STEADY OVER TIME

Over the past 2+ years, the share of variances by drug has largely remained consistent quarter-to-quarter. The most significant change across this time period was generated by Morphine. In Q1 2020, Morphine was involved in 12% of all discrepant controlled substance medication transactions. By Q4 2021, its share was reduced to 8%.

**TOP 10 DRUGS WITH VARIANCES (QUARTERLY)**



Fentanyl 23% → 22%
Midazolam 13% → 13%
Hydromorphone 12% → 10%
Morphine 12% → 8%
Lorazepam 8% → 7%
Oxycodone 8% → 6%
Acetaminophen-Hydrocodone 6% → 4%
Ketamine 3% → 4%
Propofol 3% → 3%
Methadone 2% → 2%

Q1 '20  Q2 '20  Q3 '20  Q4 '20  Q1 '21  Q2 '21  Q3 '21  Q4 '21

*Excludes "Other" drugs

# KEY TAKEAWAYS

- **8%** of all controlled substance transactions were discrepant.

- **Fentanyl, Midazolam, and Hydromorphone** continue to lead as the top drugs involved in variances.

- **79%** of all investigations are **closed in less than 30 days.**

- Investigations opened due to analytics flagged by Bluesight for Controlled Substances are more likely to result in confirmed cases of diversion compared to those opened due to routine surveillance. Data from Bluesight for Controlled Substances is most effectively used in coordination with regular monitoring and colleague reporting.

- Having a system in place where **people feel comfortable reporting** possible cases of diversion is crucial. A third of all investigations based on colleague and patient reports have led to a confirmed case of diversion.

**KIT**CHECK