Using Technology & Data Analytics to Develop Best Practices for Managing Patient Risk

JUDY TEJADA, LMHC, CASAC
RACHEL HOOPSICK, MS, MPH, CHES

Horizon
HEALTH SERVICES
Help today. Better tomorrow.

ASAP CONFERENCE – SEPTEMBER 19, 2017

Why Patient Risk Matters

- Overdose is the leading cause of accidental death: 52,000+/year[1]

- Suicide is the 10th leading cause of death: 44,000+/year[2]

- Both at all-time high rates in the United States[1,2]

- More common among individuals with co-occurring disorders[3,4]

- More common in the populations we serve

- **Preventable**

1. National Institute on Drug Abuse. Available at: https://www.drugabuse.gov/related-topics/trends-statistics/overdose-death-rates
2. American Foundation for Suicide Prevention. Available at: https://afsp.org/about-suicide/suicide-statistics/
3. National Institute of Mental Health. Available at: https://www.nimh.nih.gov/health/topics/suicide-prevention/index.shtml#part_153178
4. National Institute on Drug Abuse. Available at: https://www.drugabuse.gov/publications/drugfacts/comorbidity-addiction-other-mental-disorders
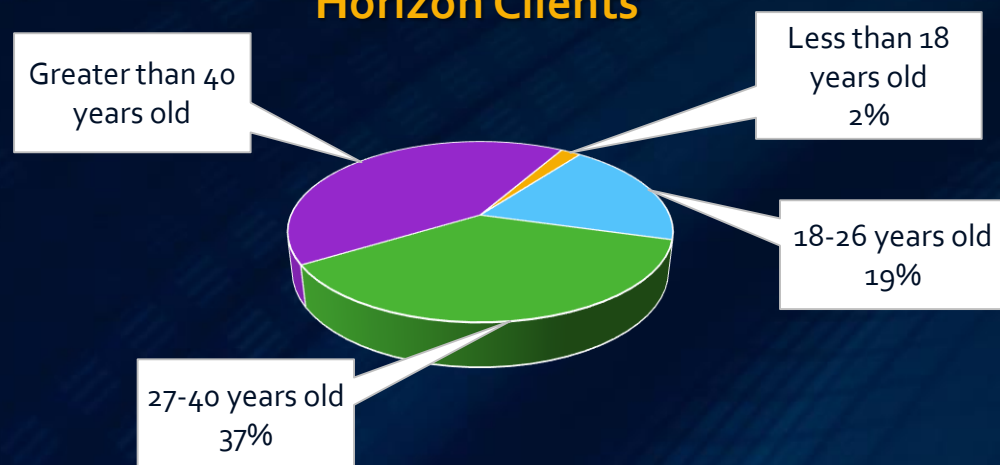
The Horizon Corporations

- Largest behavioral health services provider in Western New York

- Locations in Erie, Niagara, and Genesee Counties

- 14 Outpatient Clinics (Part 822)

- 1 Detox Facility (Part 816)

- 4 Residential Facilities (Part 820)

- Other services:
  - Health Home Care Management
  - Vocational/Educational Services
  - Recovery Coaching
  - Case Management Services
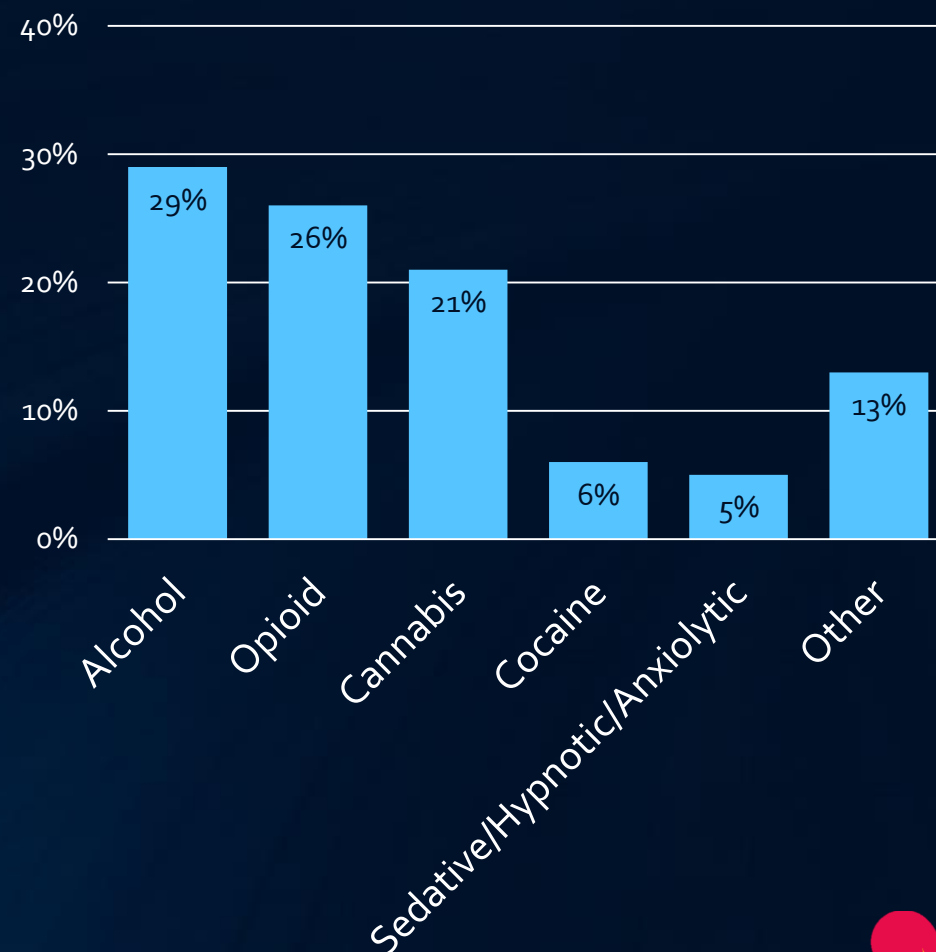 - Family Support Coordination & Community Outreach

Who We Serve

- 14,000+ clients per year

- 220,000+ services per year

- 8,000+ clients served each year have a substance use disorder

  - 42% have a co-existing mental health diagnosis

Age Distribution of Horizon Clients

Greater than 40 years old

Less than 18 years old 2%

18-26 years old 19%

27-40 years old 37%

Substance Use Disorder Diagnoses of Horizon Clients

Category	Percentage
Alcohol	29%
Opioid	26%
Cannabis	21%
Cocaine	6%
Sedative/Hypnotic/Anxiolytic	5%
Other	13%

Clinical Incidents

- **337 Incidents from May 2016 – August 2017**

  - **109 Accidental Overdoses (32%)**

  - **108 Suicide Attempts (32%)**

  - **55 Client Deaths (16%)**

    - 26 Fatal Overdoses (47%)
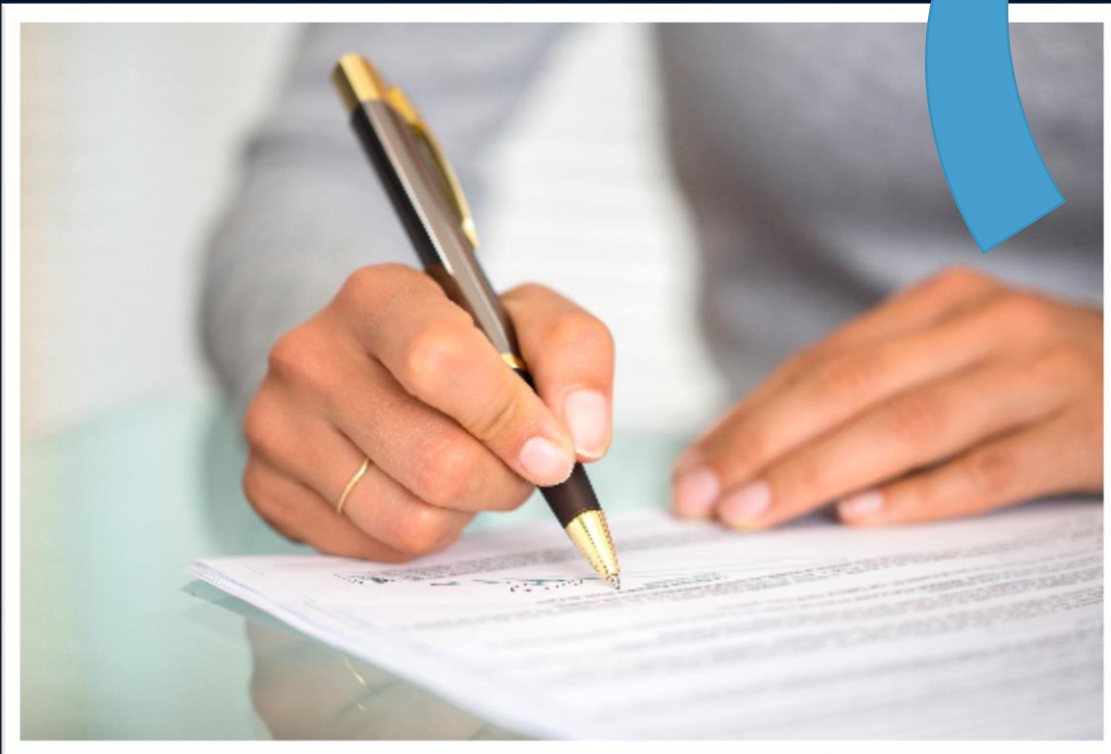
    - 10 Completed Suicides (18%)

What has been your experience with the reporting of incidents?

Is this just a process to be completed or is there value in reporting?

Old Method

- Complete paper form

- Transcribe into Justice Center web form when needed

Justice Center for the Protection of People with Special Needs | Incident Reporting Form

① **Incident Details**

Please provide a detailed description of how the incident occurred. Include:

- Whether proper supervision and protocols were in place
- Description of injuries and/or intervention required
- Safeguards put in place
- Witness information and who else was notified (law enforcement, medical personnel, administration, etc.)

(usually a minimum of 3-5 sentences)

When did the incident happen? ⓘ

Did you witness the incident?
Yes   No

When did you discover the incident? ⓘ

Was 911 or local law enforcement contacted?
Yes   No   Not Sure

- Completed incident report and disposition filed away after review

- Labor intensive and duplicative

- **How can we make this easier?** Electronic Health Record (EHR)!

Benefits of Incident Report in the EHR

- <u>Initial Ideas</u>:

    - Centralized – accessible to staff offsite, promotes coordination across programs/levels of care

    - Secure – password protected, can't be removed from site like paper chart

    - Saves clinical time – demographic and clinical information populates from other areas of the client chart

    - Saves administrative time – immediate notification when an incident report is ready for review

- <u>Added Benefits</u>:

    - Structured data – potential for reporting and analysis

Electronic Workflows

1 • Reporting clinician completes incident report in EHR (with a 2nd clinician if client is co-enrolled)

2 • Incident report is sent to and reviewed by the Program Director (with a 2nd Program Director if client is co-enrolled)

3 • Incident report is sent to and reviewed by Clinical Director (with a 2nd Clinical Director if client is co-enrolled)

4 • Incident report is sent to and reviewed by VP of Clinical Services

5 • Incident is reviewed by Special Review or Alternate Care Committee if needed

6 • Final disposition of the case is logged

Paperless workflow enhances timeliness of documentation and accountability

How Can We Use the Data?

- Summary reports with the number and types of incidents

- Trending graphs of incidents over time

- Can we build a client profile for those who are *more likely* to have an <u>accidental overdose</u> or <u>suicide attempt</u>?
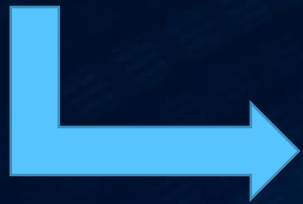
  → - Need to include questions we *think* will better characterize clients with incidents
      - Initially based on anecdotal evidence

Integrating the Incident Report in the EHR

- We included all questions on the current Justice Center web form

- What *else* would be useful to know?
    - ✓ Demographic characteristics
    - ✓ History of previous incidents
    - ✓ Medication-assisted treatment (MAT)
    - ✓ Recent discharge from residential program
    - ✓ Family involvement in treatment
    - ✓ Stage of change
    - ✓ Risk status…and more!

Who do you serve? What factors matter for your population that you would include on your incident report?

Demographic factors?
Clinical factors?
Treatment factors?

Moving toward Value-Based Care Models

Identify Population

Perform Analytics

Create Risk Stratification

Target Interventions

Measure and Monitor Outcomes

Predictive Analytics

Data Capture	Reporting	Monitoring	Predictive Analytics

Taking Action

What happened?	What is happening now?	What is going to happen?
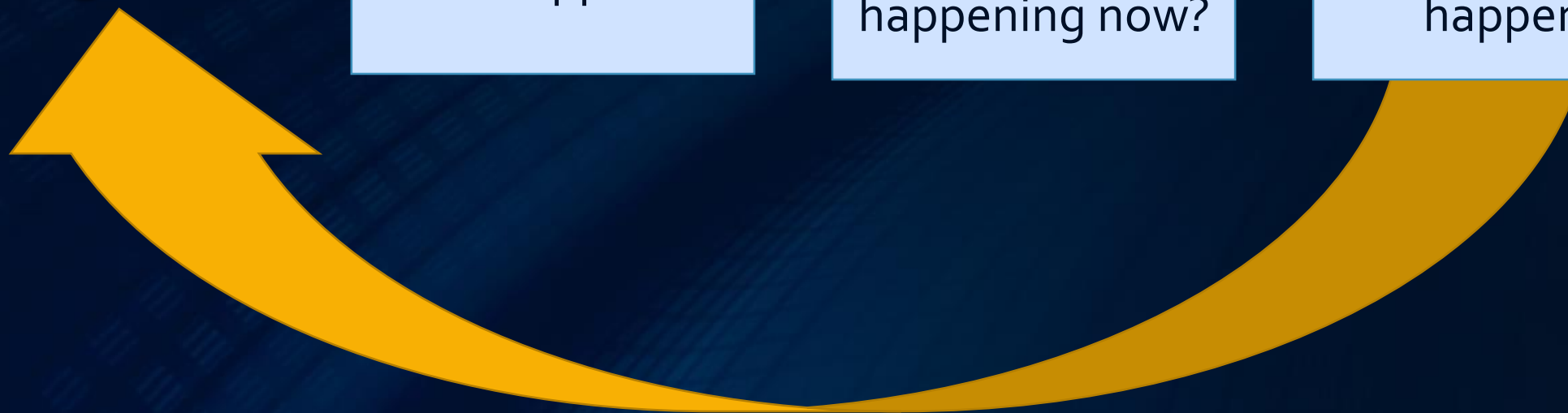
Predictive Analytics Example

| Recording the temperature each day | Looking at the average temperature for last month | Viewing the current temperature | Forecasting this weekend's temperature |

Planning for the weather

| What happened? | What is happening now? | What is going to happen? |
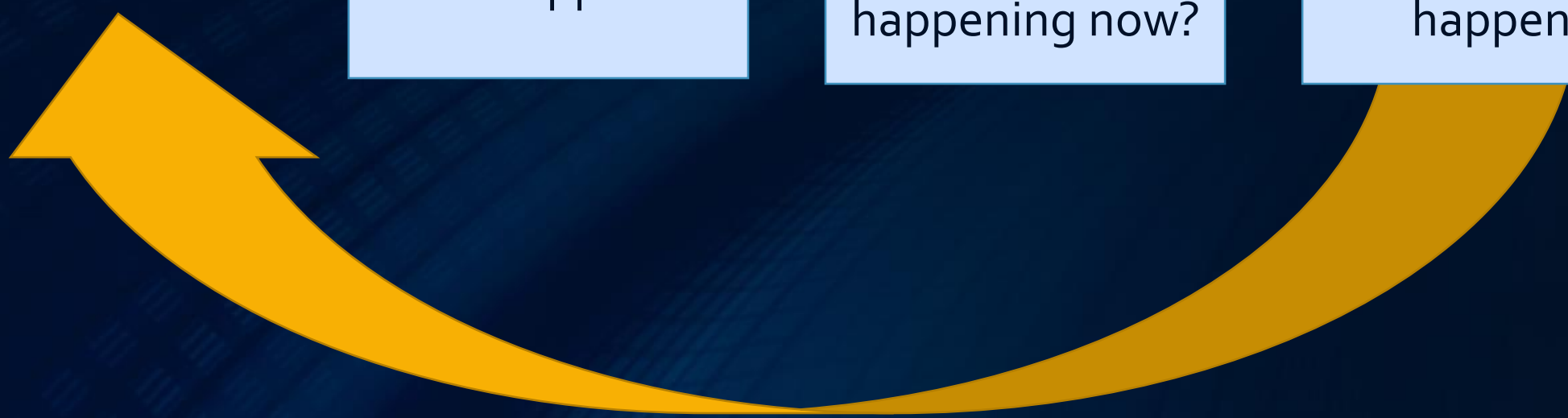
Where is your organization with respect to data analytics?

Predictive Analytics for Risk Management

GOAL:

Enter incident data into electronic health record

Use reports to summarize past incidents

Use real-time data to display current indicators

Generate a predictive model to profile client risk

*We are here

Risk Management

What happened?

What is happening now?

What is going to happen?

Our Findings: Summary Reports

Incident Type by Treatment Modality, N = 297

Legend: Accidental OD, Suicide Attempt, Death, Other

Y-axis: Number of Incidents (0, 20, 40, 60, 80, 100)

Outpatient SUD: 94, 38, 22, 18
Outpatient MH: 2, 50, 28, 1
Residential: 0, 0, 1, 43
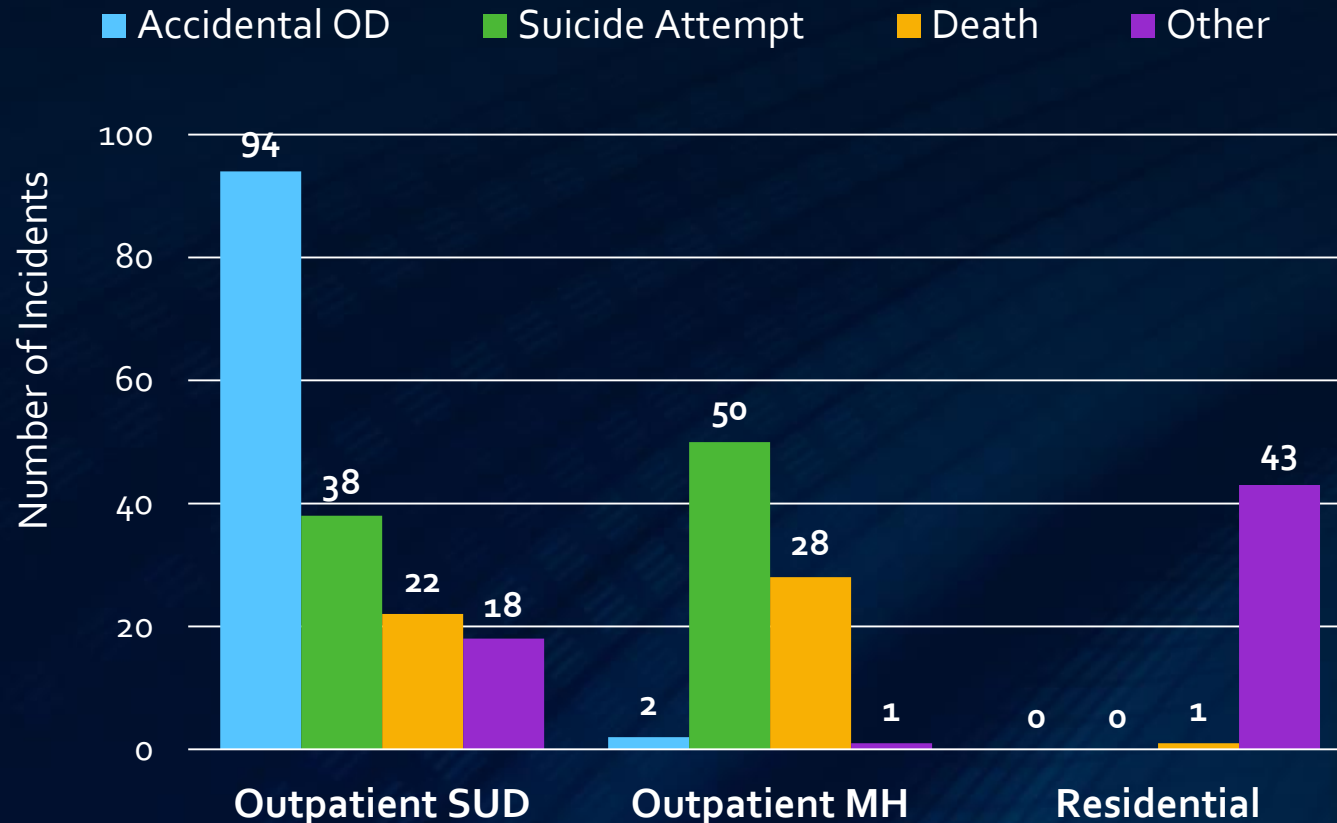
Distribution of Primary Incident Types, N = 297

Suicide Attempt, 88, 28%
Client Death, 51, 16%
Other, 61, 25%
Accidential Overdose, 97, 31%
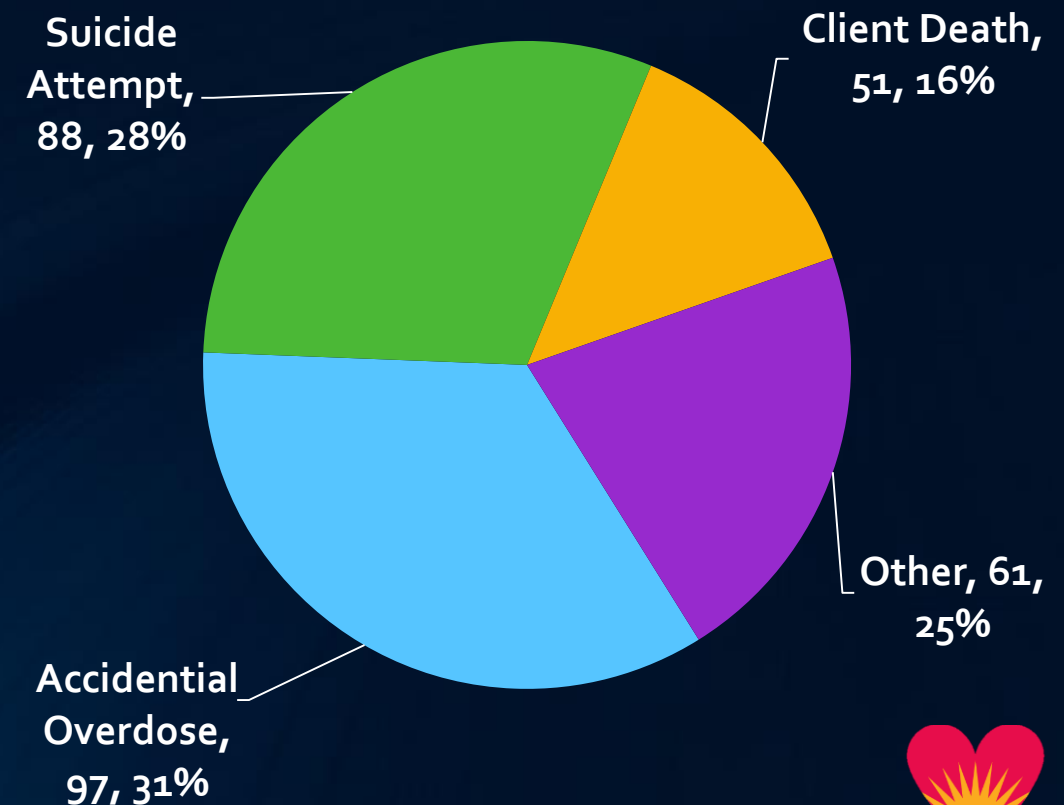
Real-Time Data Example

	Accidental Overdose	Allegation of Abuse/ Neglect of Client by Staff	Serious Crime	Suicide Attempt	Other	Death of Client	Potentially Harmful Treatment Practices	SUM
Program A	6					2		8
Program B	8			4		1		13
Program C				1				1
Program D				1				1
Program E	2		1	1		2		6
Program F				1		3		4
Program G				4		2		
Program H	3		5	1				
Program I				2		3		
Program J					1			
Program K		1						
Program L	9			2		3		
Program M				5		3		
Program N		1			1	1		
Program O	8			2				12
Program P				4		1		5
Program Q	2		1	2				5
Program R				3				3
Program S						1		1
Program T	5			2		1		8
Program U	2			4		1		7
Program V	1			2				3
Program W				1				1
Program W			1		1			2
Program X				2				2
Program Y	5			2		1		8
Program Z	51	2	8	46	3	27	1	138

Gives current YTD summary by program and incident type

Real-Time Data Example

Date of Incident	Date Opened	Date Closed	LOS, Days	Risk Status	Type of Incident	HV in the past 6 months?	History of Incident Type?	Adherence to Tx Plan Recommendations?	Recent Change in Health Condition?	Change in Medication Past 30 Days?	Family Involved in Treatment at Time of Incident?	Substance Use Involved in Incident?	Narcan Used?	MAT Client?
1/2/17	10/4/16	1/10/17	98	LEVEL1	Accidental Overdose	Yes	Y	N	N	N	Yes	Y	Y	Yes
1/3/17	5/24/17		84	LEVEL1	Accidental Overdose	No	Y	Y	N	N	No	Y	Y	Yes
1/6/17	12/2/16	1/17/17	46	LEVEL1	Accidental Overdose	No	N	N	N	N	Yes	Y	Y	Yes
1/8/17	8/2/17		14	LEVEL3	Serious Crime	No	N	Y	N	N	No	Y	N	
1/11/17	7/27/17		20	LEVEL1	Suicide Attempt	No	Y	N	N	N	No	N		
1/11/17	8/9/17		7	LEVEL1	Accidental Overdose	Yes	Y	N	N	N	No			
1/11/17	11/2/16	1/10/17	69	LEVEL4	Death of Client	No	N	Y	N		Yes			
1/11/17	7/13/17		34	LEVEL1	Accidental Overdose	Yes	N	N	N		Yes			
	8/7/17		9	LEVEL1	Accidental Overdose	Yes	N	N	N					
1/13/17	3/17/05	1/13/17	4,320	LEVEL2	Death of Client	No	N	Y	Y					
1/14/17	8/4/17		12	LEVEL2	Suicide Attempt	No	Y	Y	N					No
1/19/17	9/23/15		693	LEVEL4	Suicide Attempt	No	Y	Y	N					No
1/19/17	3/9/17		160	LEVEL3	Serious Crime	No	N	Y	N					
	4/25/17		113	LEVEL3	Serious Crime	No	N	Y	N			U		
1/20/17	11/2/16	1/24/17	83	LEVEL4	Serious Crime	No	Y	Y	N			Y	N	
1/21/17	12/8/16	12/29/16	21	LEVEL1	Death of Client	Yes	Y	Y	N	N		Y	U	No
1/22/17	10/31/16		289	LEVEL3	Suicide Attempt	No	N	Y	N	N		U		No
1/23/17	12/30/16		229	LEVEL1	Serious Crime	No	N	Y	Y	Y	Yes	U		
	5/12/17		96	LEVEL1	Serious Crime	No	N	Y	Y	Y	Yes	U		
1/23/17	10/5/16	1/18/17	105	LEVEL 5	Death of Client	No	N	Y	Y	Y	No	U		No
1/25/17	1/19/16		575	LEVEL2	Suicide Attempt	No	Y	Y	N	Y	Yes	N		No
1/25/17	2/9/17	2/24/17	15	LEVEL1	Suicide Attempt	No	Y	Y	N	Y	No	U		Yes
1/26/17	11/28/16	2/2/17	66	LEVEL3	Accidental Overdose	No	Y	Y	N	N	Yes	Y	Y	Yes
1/27/17	11/11/16	2/1/17	82	LEVEL 5	Accidental Overdose	No	Y	Y	N	N	Yes	Y	U	No
1/29/17	10/30/16	2/27/17	120	LEVEL2	Suicide Attempt	No	Y	Y	N	N	No	Y	N	No

Gives current YTD listing of incidents, including incident details

What We Have Learned

- **National statistics indicate:**

  - Females attempt suicide **3** times as often as males

  - Males are **4** times more likely than females to die by suicide

- **Our data show:**

  - Suicide Attempts: 58% female, 42% male

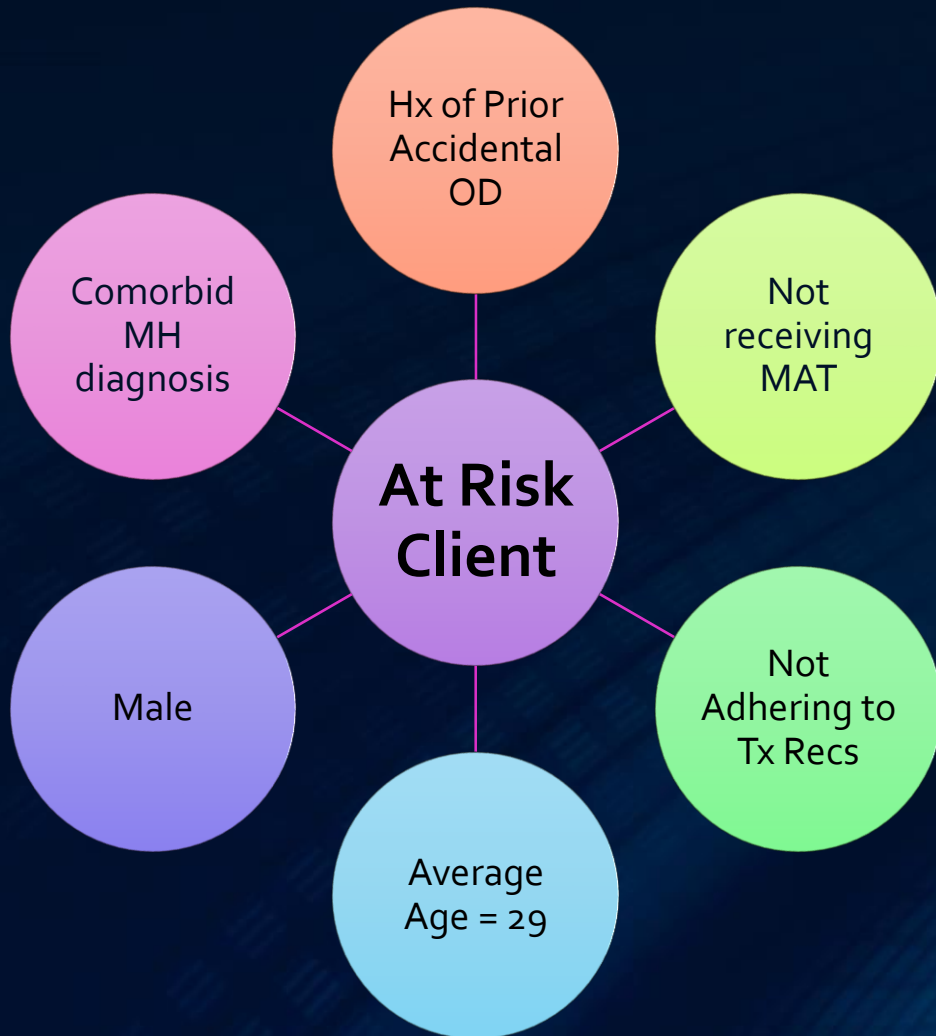 - Completed Suicides: 90% male, 10% female

Other Findings

- **Medication-assisted treatment (MAT)** is protective against overdose, but poor rates:
  - 48% of all clients with an opioid diagnosis receiving MAT
  - 19% of all clients who experienced an overdose received MAT

- **Residential treatment** is protective against accidental overdose
  - 75% of discharges from rehabilitation link to a lower level of care within 2 days of discharge

Our Findings: Client Profiles

Accidental Overdose

- Hx of Prior Accidental OD
- Comorbid MH diagnosis
- Not receiving MAT
- **At Risk Client**
- Male
- Not Adhering to Tx Recs
- Average Age = 29

Suicide Attempt

- Hx of Prior Suicide Attempt(s)
- Bipolar, Depressive, Psychotic & Trauma DOs
- Comorbid Substance Use
- **At Risk Client**
- Female
- Not Adhering to Tx Recs
- Average Age = 36

Next Steps

- Use data to build a *predictive* model:

  - Estimates the probability of an event (e.g. accidental overdose) *before* it occurs

  - Based on established factors that increase or decrease risk of the event

  - Factors are weighted to produce an overall probability of the event for *individual clients*

  - <u>Example:</u>

    Debbie's probability of accidental overdose is 12%
    John's probability of an accidental overdose is 89%

<u>Clinical Utility</u>: *How might you manage these cases differently with this additional information?*

Summary of Implementation Steps

1. Select relevant questions to ask at the time of incident

2. Integrate incident report into EHR

3. Develop clinical and administrative workflows

4. Collect data   *(Data In)*

5. Abstract data   *(Data Out)*

   - What happened? – Summary Reports

   - What's happening? – Real-time Data

   - What's going to happen? – Predictive Analytics

Thank You!

JUDY TEJADA – VP OF CLINICAL SERVICES
JTEJADA@HORIZON-HEALTH.ORG

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