

# Ted Talks – Clinical Informatics

## Fellows Edition - 2018

- **Artificial Intelligence and Blockchain, for Medical Imaging**
  - Alaa Alsadi, MD, Clinical Informatics Fellow, University of Illinois at Chicago
- **Clinical Informatics: Understand People and Process**
  - Viper Bodar, MD, Clinical Informatics Fellow, University of New Mexico
- **A Brave New World**
  - Reza Sadeghian, MD, Clinical Informatics Fellow, University of Washington

# Blockchain to Accelerate Artificial Intelligence in Medical Imaging; the “Diagnosis Protocol”

AMDIS **TED<sup>x</sup>** Talk: Clinical Informatics Fellow Edition

Alaa Alsadi, MD.

University of Illinois at Chicago (UIC)

Roger Boodoo, MD.

US Navy- Defense Health Agency (DHA)

6/21/ 2018

# Disclosure

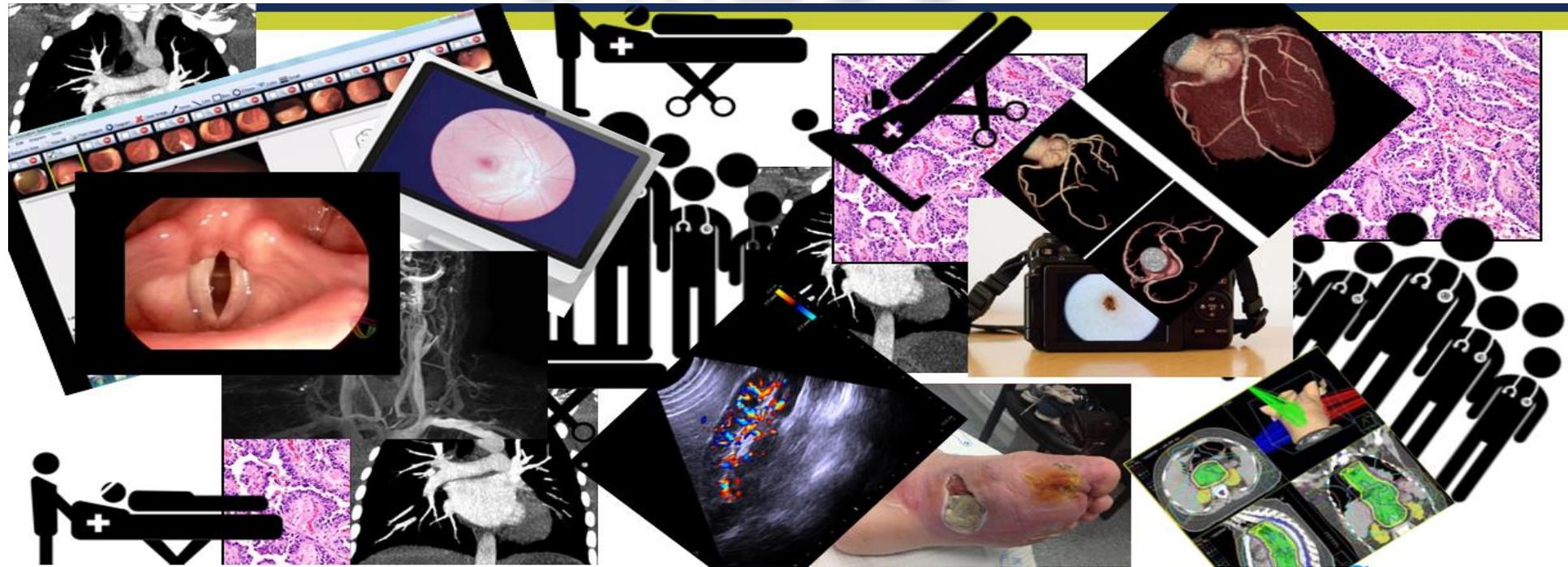
- Diagnosis Protocol (co-founder equity)



- Next Gen Miners (partner equity)



# AI Imaging Datasets: a MESS



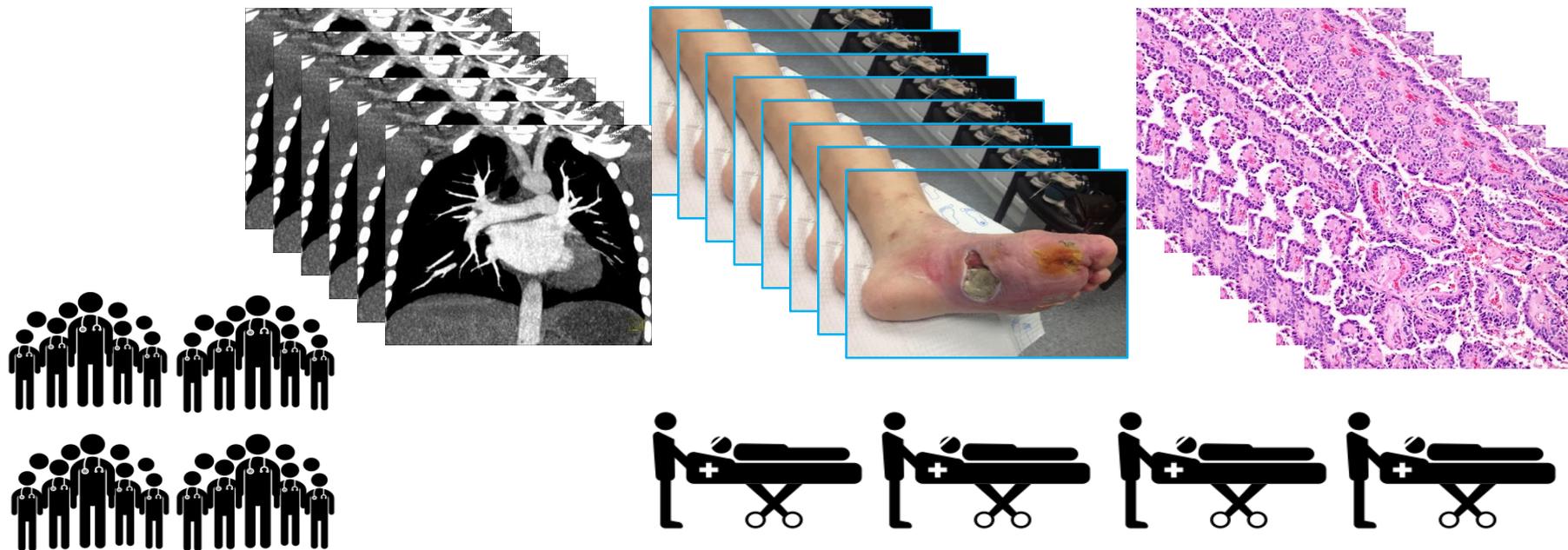
# Not a Tech Problem



<https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=imgres&cd=&cad=rja&uact=8&ved=2ahUKEwio2oOYk-DbAhWfGDQIHTExA-kQjRx6BAGBEAU&url=https%3A%2F%2Fitexperts.co.za%2F4-common-computer-problems-can-fix%2F&psig=AOvVaw1INzox8QAG5Xzx40RJ1m3A&ust=1529512224651489>



# Global Collaboration Needed to Build AI



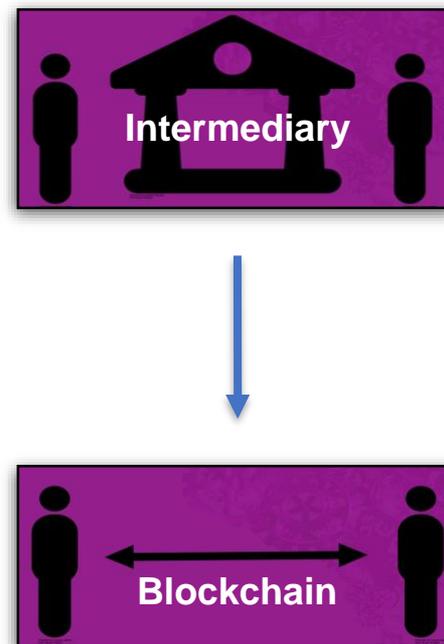
# A Solution: Blockchain



- Incentivize data structuring
- Guarantee quality of data

# A Word about Blockchain

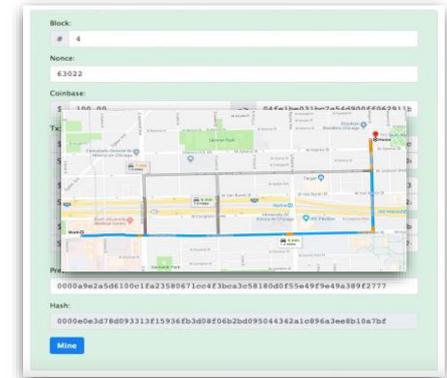
- The technology for replacing intermediaries
- Ultimate audit trail, asset tracking, and security
- Direct, digital connection, between an activity and a value (Smart Contracts)



# Smart Contracts; an Example



- Bitcoin is the prototypical Blockchain 1.0; currency/ money transactions
- Ethereum is the prototypical Blockchain 2.0; VALUE transactions
- Made available via SMART CONTRACTS



# The Future of Value Exchange



The Internet

The Cloud

The Blockchain

Information Exchange

Value Exchange

<https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=2ahUKEwjSmP-SpeDbAhUIG3wKHVOMDvIQjRx6BAgBEAU&url=http%3A%2F%2Fwww.ibmbigdatahub.com%2Fblog%2Fwhat-blockchain-and-what-does-it-have-do-internet-things&psig=AOvVaw1ioQhIYG04-GzDWDzrxYn8&ust=1529516996916360>

# Diagnosis Protocol: an Image Annotation Blockchain

**RADIOLOGIST VIEW**

**Diagnosis Protocol**  
Artificial Intelligence. Accelerated.

Dashboard Logout

### Images

Radiology  Pathology

Images Available: 5

Image	Annotate
	ANNOTATE

NEW IMAGE

### Wallet

Wallet  
220 DXP

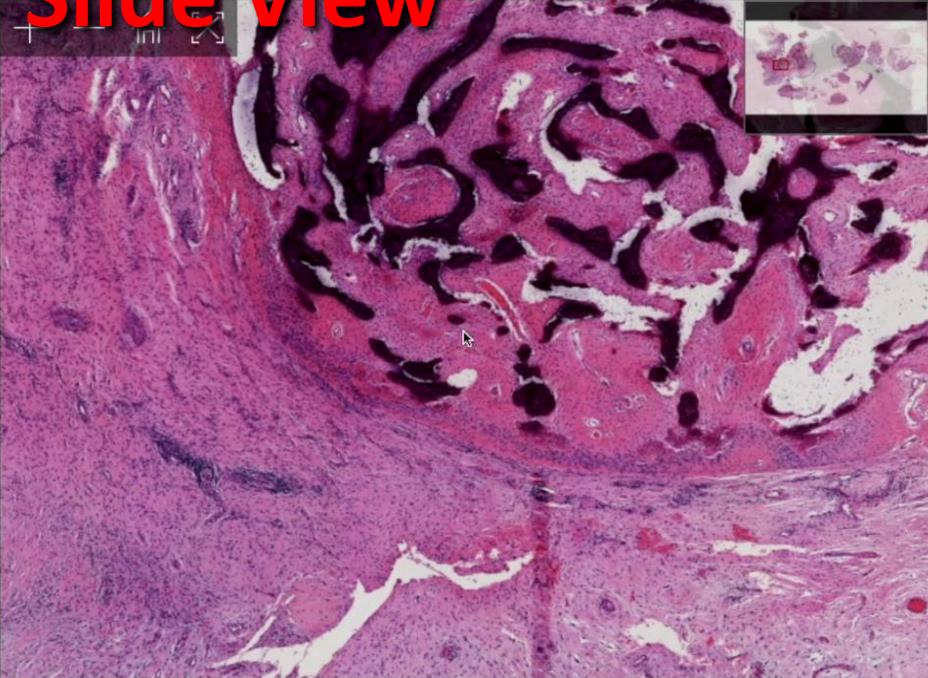
Date	Amount	Description
Wed, 18 Apr 2018 19:37:38 +0000	200 DXP	Initial deposit
Wed, 18 Apr 2018 19:42:00 +0000	5 DXP	Payment
Wed, 18 Apr 2018 19:42:15 +0000	5 DXP	Payment
Wed, 18 Apr 2018 19:47:39 +0000	5 DXP	Payment
Wed, 18 Apr 2018 19:48:01 +0000	5 DXP	Payment
Wed, 18 Apr 2018 19:48:47 +0000	5 DXP	Payment
Sun, 22 Apr 2018 21:52:13 +0000	5 DXP	Payment
Sun, 22 Apr 2018 21:52:38 +0000	-5 DXP	Deduction
Tue, 24 Apr 2018 03:09:54 +0000	-5 DXP	Deduction

# Specialty Agnostic

## Pathologist Whole Slide View

Diagnosis Protocol  
Artificial Intelligence Accelerated

Dashboard Logout



fibrosis  
 fibrous  
dysplasia

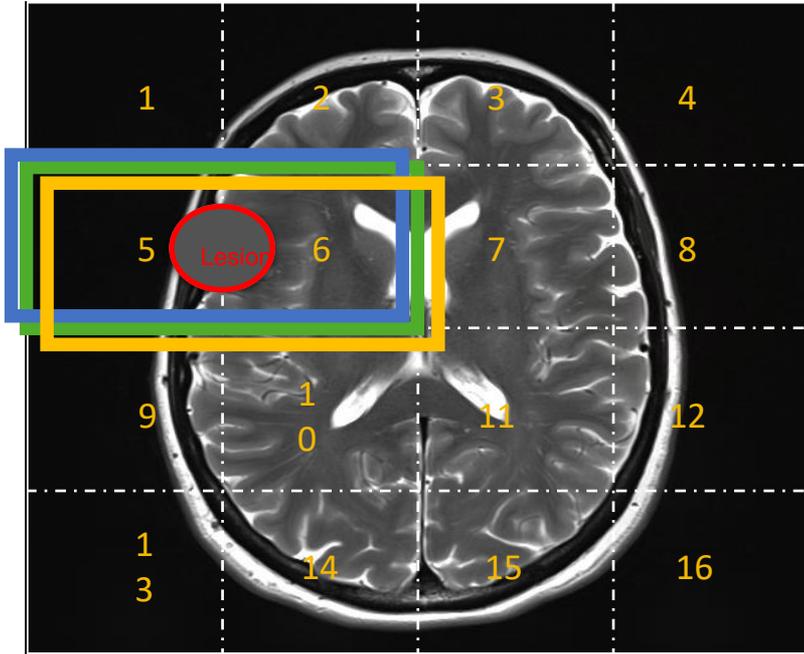
SUBMIT >

Back

The image shows a web interface for a pathology AI tool. At the top, there's a navigation bar with 'Diagnosis Protocol' and 'Artificial Intelligence Accelerated' on the left, and 'Dashboard' and 'Logout' on the right. The main content area displays a histology slide with a mouse cursor pointing to a specific area. Below the slide, there are three radio button options: 'fibrosis', 'fibrous', and 'dysplasia'. At the bottom, there is an orange 'SUBMIT' button with a right-pointing arrow. A 'Back' link is visible in the bottom left corner.

# Smart Contracts: Annotation

## → Reward



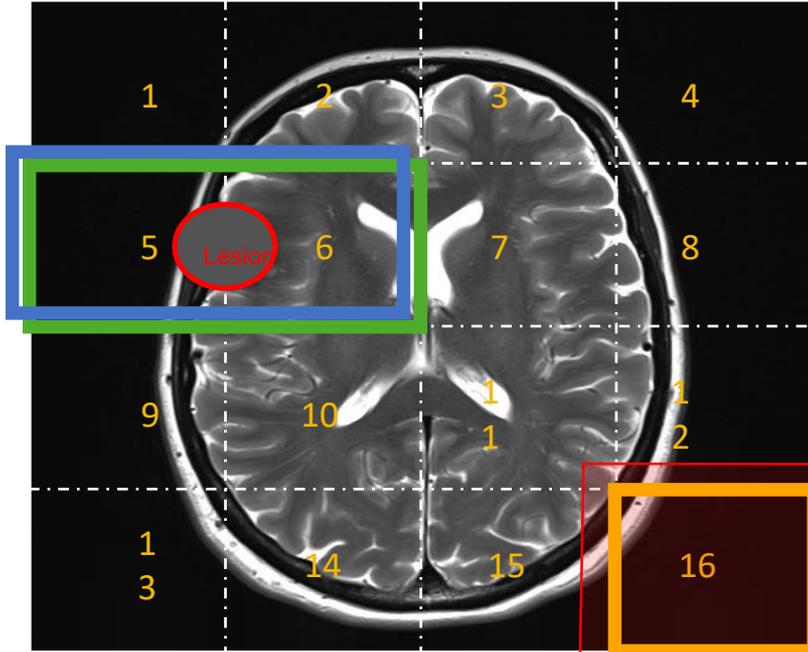
✓ Doctor # 1; zones 5&6

✓ Doctor # 2; zones 5&6

✓ Doctor # 3; zones 5&6

Date	Amount	Description
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Wed, 18 Apr 2018 19:42:00 +0000	5 DXP	Payment
Wed, 18 Apr 2018 19:42:15 +0000	5 DXP	Payment
Wed, 18 Apr 2018 19:47:39 +0000	5 DXP	Payment
Wed, 18 Apr 2018 19:48:01 +0000	5 DXP	Payment
Wed, 18 Apr 2018 19:48:47 +0000	5 DXP	Payment
Sun, 22 Apr 2018 21:52:13 +0000	5 DXP	Payment
Sun, 22 Apr 2018 21:52:38 +0000	-5 DXP	Deduction
Tue, 24 Apr 2018 03:09:54 +0000	-5 DXP	Deduction

# Smart contracts: Data Quality



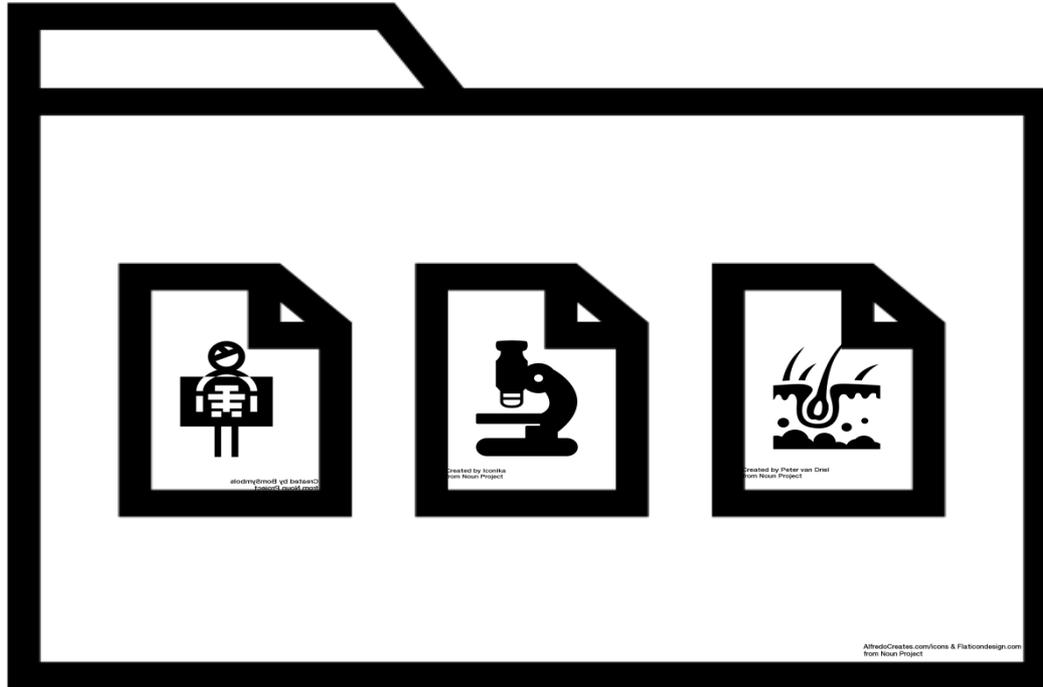
Doctor # 1; zones 5&6

Doctor # 2; zones 5&6

Doctor # 3; zone 16

Date	Amount	Description
Wed, 18 Apr 2018 19:37:38 +0000	200 DXP	Initial deposit
Wed, 18 Apr 2018 19:42:00 +0000	5 DXP	Payment
Wed, 18 Apr 2018 19:42:15 +0000	5 DXP	Payment
Wed, 18 Apr 2018 19:47:39 +0000	5 DXP	Payment
Wed, 18 Apr 2018 19:48:01 +0000	5 DXP	Payment
Wed, 18 Apr 2018 19:48:47 +0000	5 DXP	Payment
Sun, 22 Apr 2018 21:52:13 +0000	5 DXP	Payment
Sun, 22 Apr 2018 21:52:38 +0000	-5 DXP	Deduction
Tue, 24 Apr 2018 03:09:54 +0000	-5 DXP	

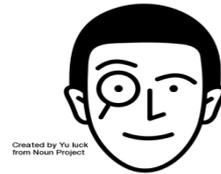
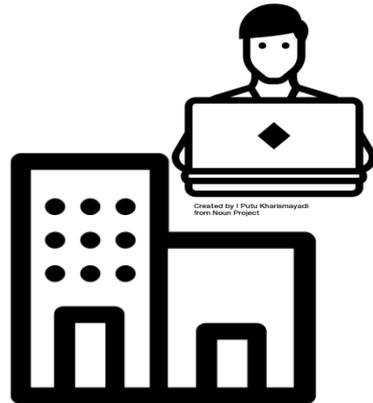
# Annotated Medical Imaging Datasets



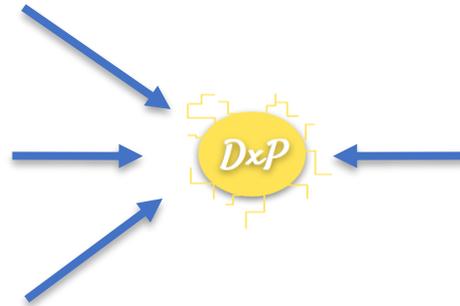
# Token Economy

Developers

(Imaging,  
AI/ Tech, Device  
Manufacturer,  
etc.) **Companies**

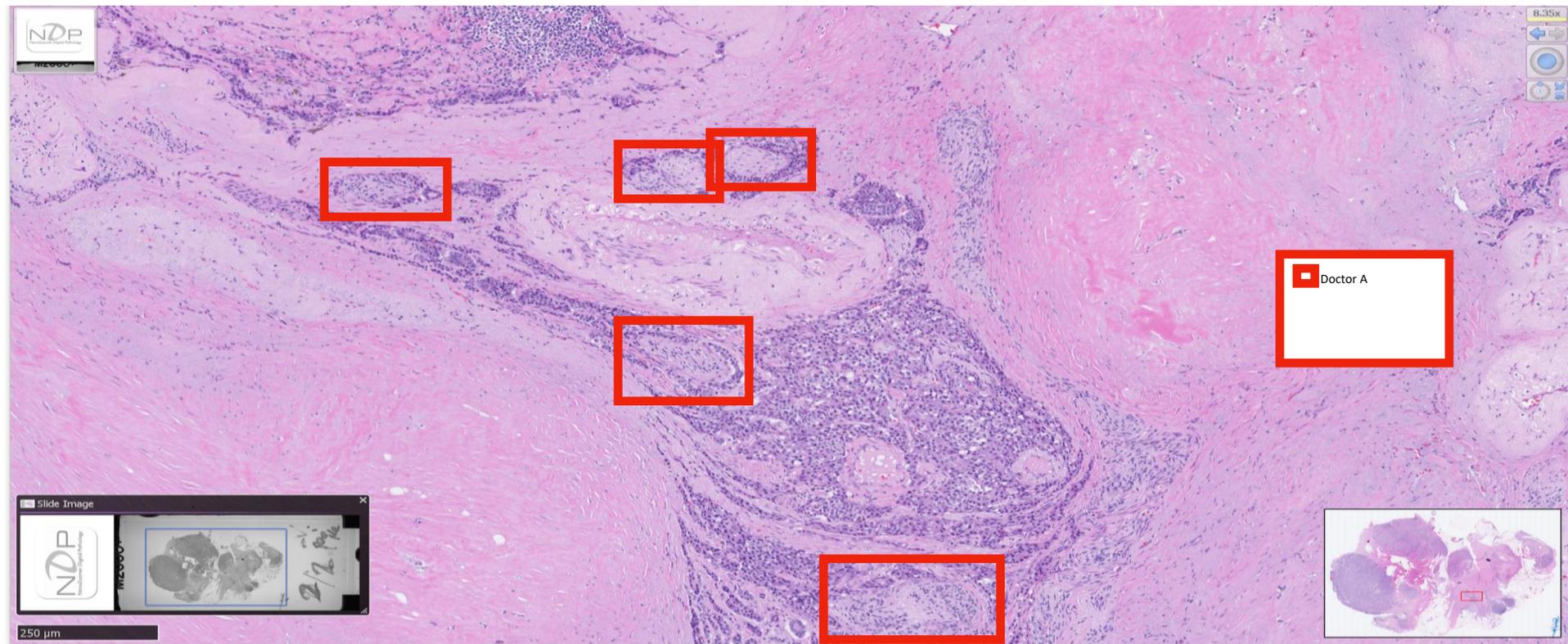


Researchers

A stack of four overlapping wallet screens. The top screen is the most visible and contains a table of transactions. Attribution: Created by Yu lick from Noun Project.

Date	Amount	Description
Wed, 18 Apr 2018 19:37:38 +0000	200 DXP	Initial deposit
Wed, 18 Apr 2018 19:42:00 +0000	5 DXP	Payment
Wed, 18 Apr 2018 19:42:15 +0000	5 DXP	Payment
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Wed, 18 Apr 2018 19:48:01 +0000	5 DXP	Payment
Wed, 18 Apr 2018 19:48:47 +0000	5 DXP	Payment
Sun, 22 Apr 2018 21:52:13 +0000	5 DXP	Payment
Sun, 22 Apr 2018 21:52:38 +0000	-5 DXP	Deduction
Tue, 24 Apr 2018 03:09:54 +0000	-5 DXP	Deduction

# Blockchain Audit Trail

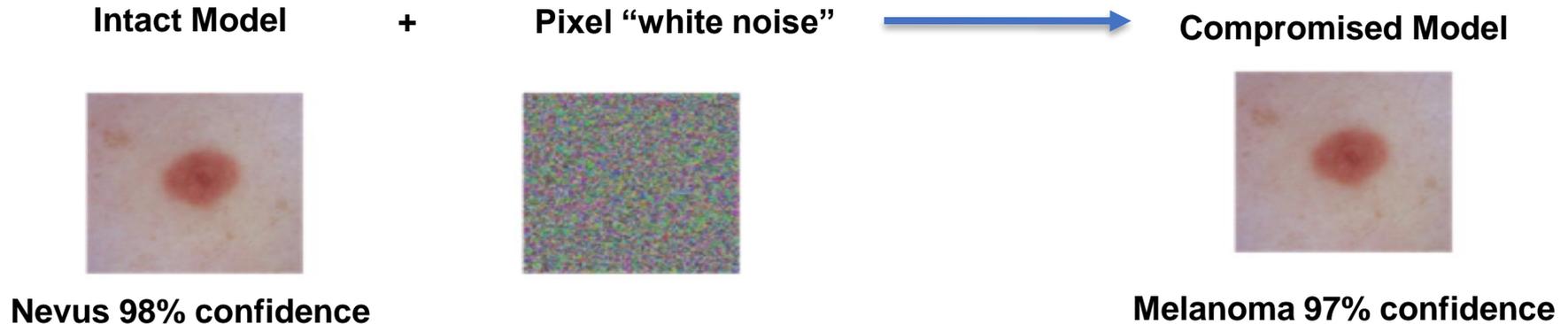






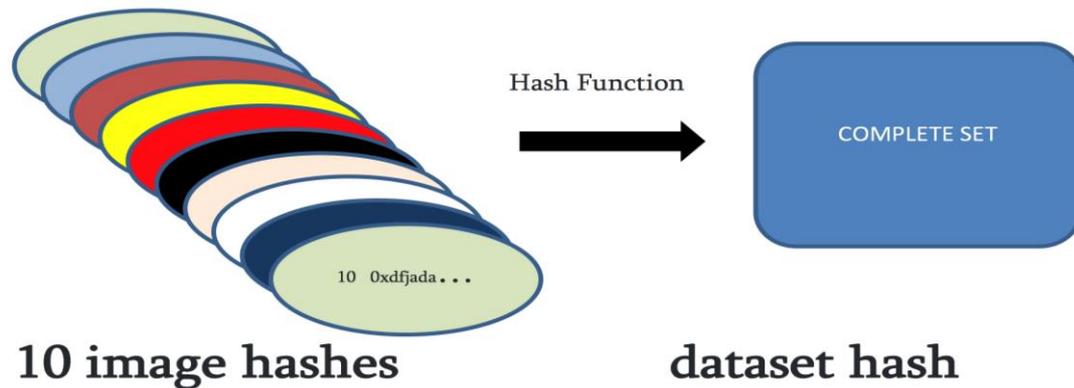
# Cybersecurity in Deep Learning

- Adversarial examples are inputs to machine learning models that an attacker has intentionally designed to cause the model to make a mistake



# Cybersecurity in Deep Learning

- The image and associated metadata should be hashed to ensure that the data has not been altered by bad actors
- Furthermore, the hash of many hashes (Merkle tree) can represent the entire dataset. One can verify that work was performed on the entire dataset prior to purchasing.



# Diagnosis Protocol at SIIM



## Judges



**Navid Farzad**  
Partner  
Morgan Noble Healthcare Partners

Navid Farzad has been a Partner at Morgan Alliance, Capgemini Health, Truist Health | Funds, an exclusively healthcare focused Farzad held positions with Lehman Bros group and Arthur Andersen's healthcare Arts from Loyola University.



**Woojin Kim, MD**  
Chief Medical Information Officer  
Nuance Communications

Dr. Kim is Chief Medical Information Officer of the Board of Directors, and Director of i part. Dr. Kim had served as interim Chief Informatics, and Chief of Radiology at M&K Fellowship training at the Hospital i University of Maryland-Baltimore VA Me societies, including ACR, SIIM, and RSNA



**Elliot L. Siegel, MD, FSIIM**  
Professor of Radiology, University of Ma  
Chief, Imaging Services, VA Maryland He

Dr. Elliot Siegel is Professor and Vice Cha Department of Diagnostic Radiology, an System, both in Baltimore, MD. He has a Park and as Professor of Computer Scie include digital imaging and PACS, teleme



**Khan M. Siddiqui, MD**  
Chief Technology Officer and Chief Medi  
High Sit, Inc.

Dr. Khan Siddiqui is a serial entrepreneur, with the largest self-service health kiosk leads the development of his product Manager at Microsoft responsible for ph was deep learning research that led to i healthcare and technology expert focus Professor at John Hopkins University ScI ubiquitous access to health in combinat



# UIC CI Fellowship Program



K. Kochendorfer  
CHIO



F. Behm  
Chairman, Pathology



T. Patel



Shane Borkowsky  
and CHIO team



Alaa Alsadi



Roger Boodoo



Dave Chestek



Monique Diaz



Bhrandon Harris



Zach Sonnier

- One of the first ACGME accredited programs in the country (9/2014)
- 4 Core Components (2 years)

Clinical Service  
Didactics  
Projects  
Rotations



MATTER

107TH ANNUAL MEETING

GEARED TO LEARN



LEARN

USCAP

#IAMUSCAP  
#USCAP2018

Proposed  
Blockchain

# Thank You!

Updates at **AMIA Annual Symposium**  
San Francisco Nov 3 - 7

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**Blockchain Fundamentals for the Healthcare Professional:**

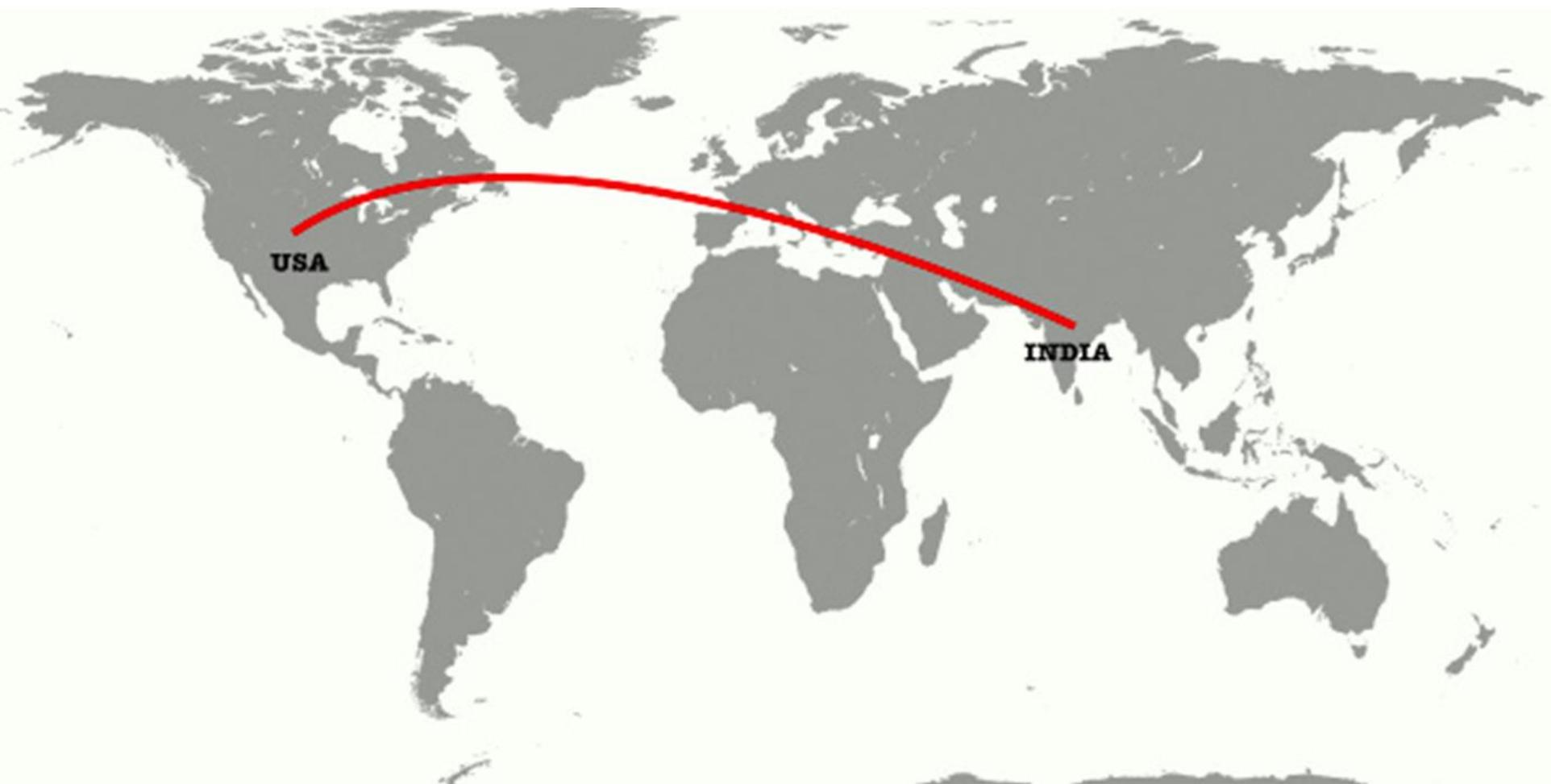
Realities, Use-cases, and Future Implications.

Boodoo R MD, Diaz M MD, Taylor J MD, **Alsadi A MD**



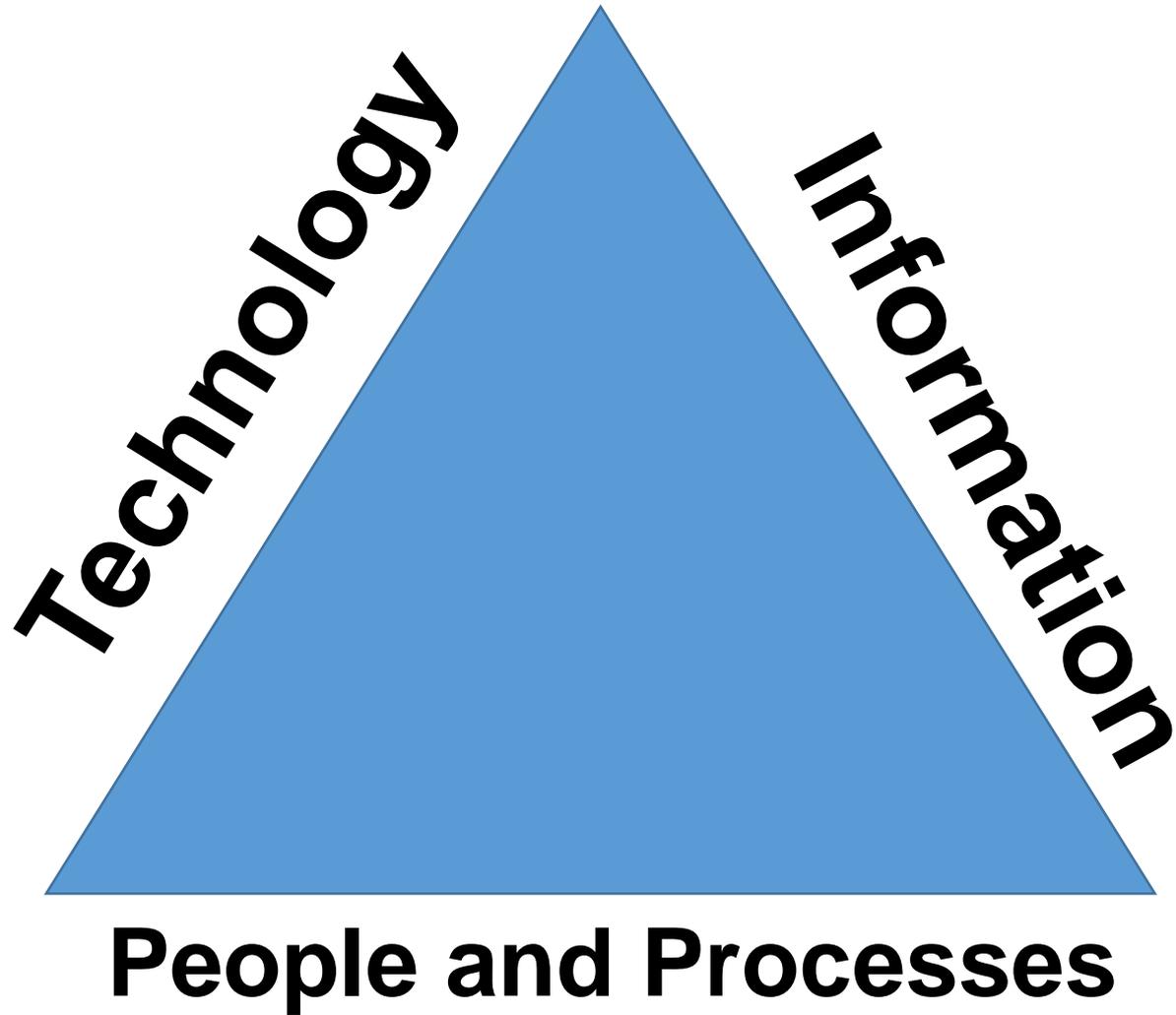
# Clinical Informatics: Understand People and Process

Viper Bodar, MD,  
Clinical Informatics Fellow  
University of New Mexico

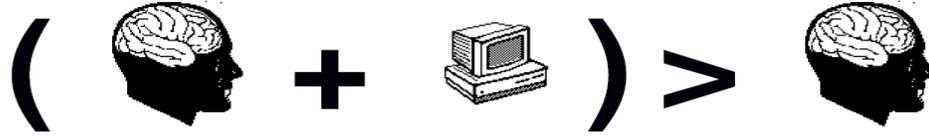


**USA**

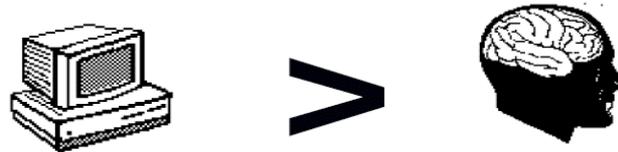
**INDIA**



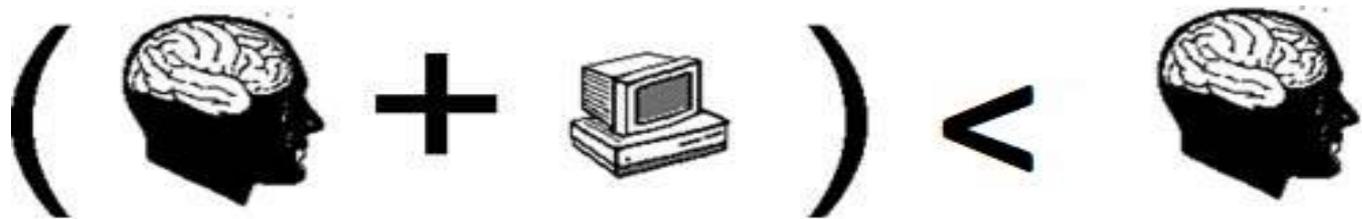
# Goal



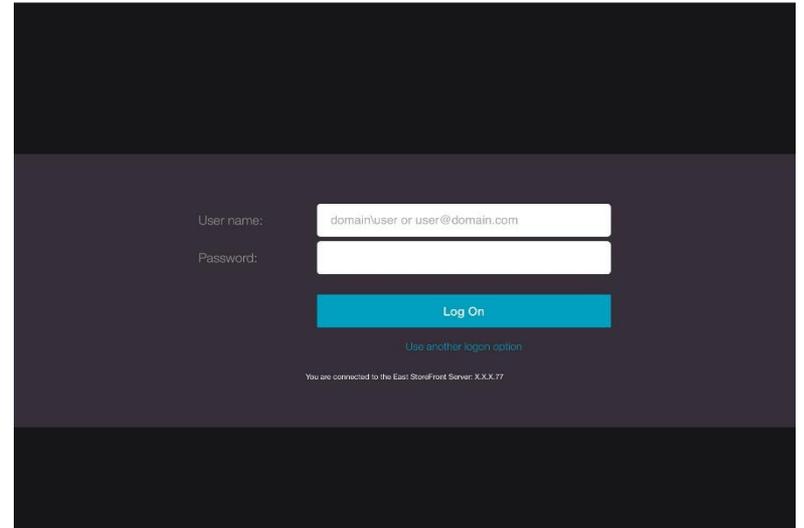
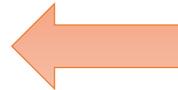
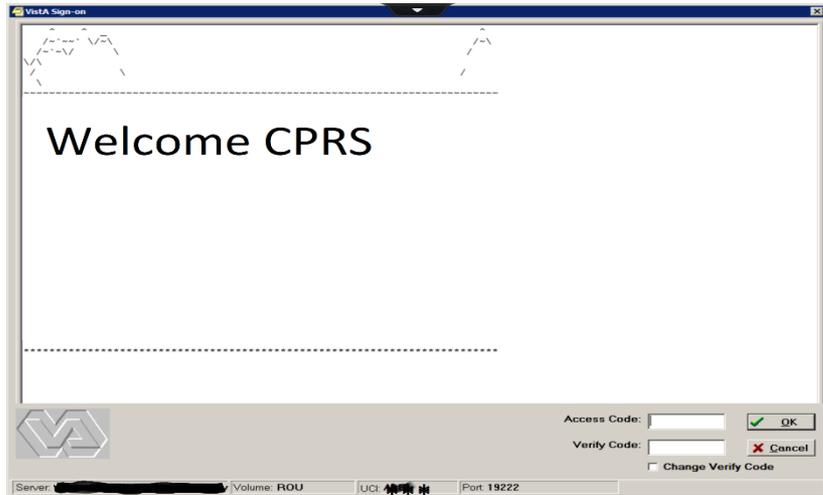
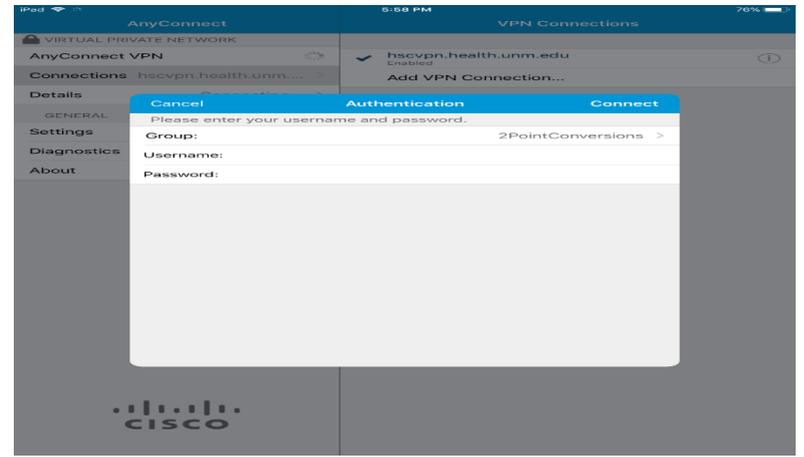
# NOT Goal



\*From Chuck Friedman







ZZTESTPATIENT,VISN XVIII (OUTPATIENT) Visit Not Selected No PACT/HBPC assigned at any VA location /  
000-00-1818 Jan 18,1950 (68) Provider: BODAR,VIPUL Flag JLV ? Postings  
Remote Data A

COMPLETED DIABETIC TELERETINAL RE Mar 30,18 DIABETIC TELERETINAL READER CONSULT REPORT (#34834709), ABQ CAC TEST CLINICX, ROBERT J CRAMMER

Alerted Consult  
Mar 28,18 (c) ACS TELERET

LOCAL TITLE: DIABETIC TELERETINAL READER CONSULT REPORT  
STANDARD TITLE: DIABETOLOGY NOTE  
DATE OF NOTE: MAR 30, 2018@07:25 ENTRY DATE: MAR 30, 2018@07:25:34  
AUTHOR: CRAMMER,ROBERT J EXP COSIGNER:  
URGENCY: STATUS: COMPLETED

IMAGE QUALITY ASSESSMENT:  
Image quality inadequate due to:  
Missing field

DIABETIC SURVEILLANCE ASSESSMENT:  
Type 2 Diabetic Patient  
RIGHT RETINAL IMAGES:  
Retinopathy Assessment:  
Image not adequate to determine  
Macula Assessment:  
Image not adequate to determine  
Optic Nerve Assessment:  
Image not adequate to determine

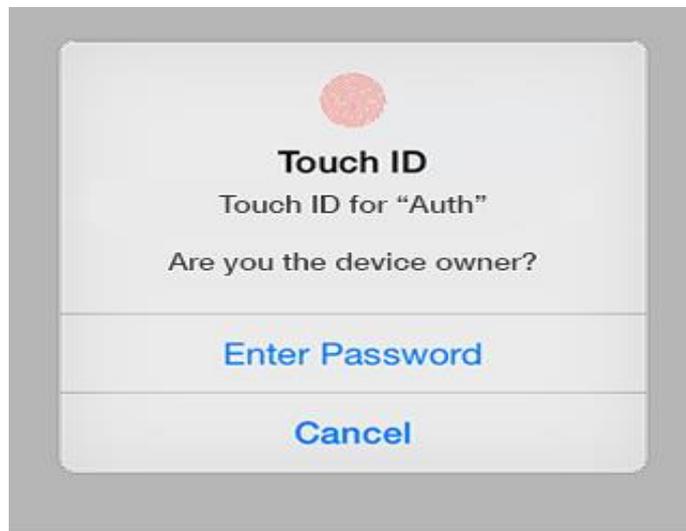
Tab Esc Win Ctrl Alt Del Cut Copy Paste Undo

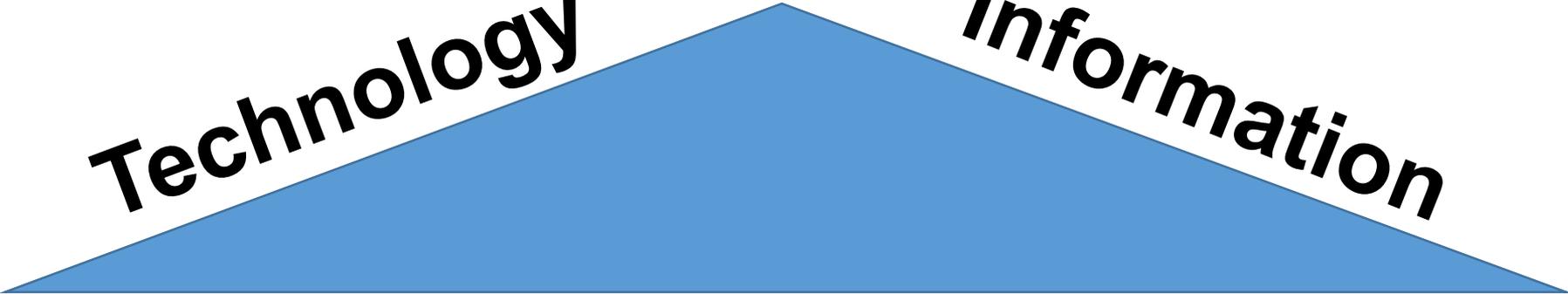
1 q 2 w 3 e 4 r 5 t 6 y 7 u 8 i 9 o 0 p

@ a # s \$ d & f \* g ( h ) ' k " l return

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.?123





**Technology**

**Information**

**People and Processes**



# A Brave New World



**June 21, 2018**

Reza Sadeghian, MD, MBA, MSc

James Metz, MD, MPH

Darren Migita, MD

Carlos Villavicencio, MD, MMI

Michael Leu, MD, MS, MHS



**Seattle Children's**  
HOSPITAL • RESEARCH • FOUNDATION

**UW Medicine**  
UW SCHOOL  
OF MEDICINE

# Case

- Sept 2015
- 17 m/o male brought to the ED by parents due to concerns of sexual abuse by a friend of the family
- Bruises on face and leg
- Sent home with family for follow up with PCP
- 2-weeks later was pronounced dead at home, found to have multiple rib fractures, clavicle fracture and severe abdominal trauma



# Epidemiology of Child Abuse

20,000 American kids killed in their own homes in the last 10 years

1,670-1,740 kids die each year

5 kids are murdered each day

80% of child fatalities involve at least 1 parent



# Identifying The Root Cause Analysis And Counter Measures

Problem: Despite good evidence on bruising as sentinel injuries of abuse, there is no standard workup among ED physicians on bruises found on children.

- Lack of Knowledge
- Inadequate process
- Lack of leveraging technology

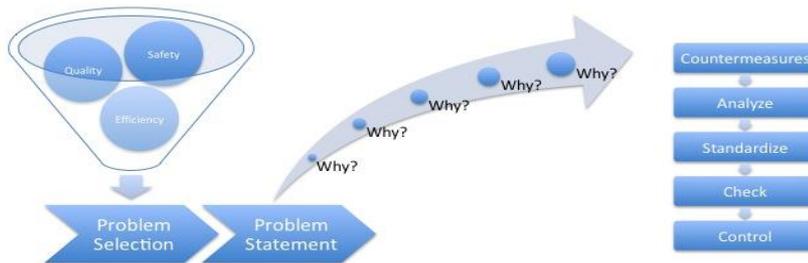


# Identifying The Root Cause Analysis And Counter Measures

## Root Causes

- Lack of Knowledge
- Inadequate process
- Lack of leveraging technology

### Root Cause Analysis Process



## Counter Measures

- Create a clinical standard pathway algorithm
- Create a standard screening power form and process for RN-
- Track the metrics to ensure the standards are followed and improved upon

# Clinical Standard Work ( CSW)

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## Clinical Standard Work (CSW): 3 components

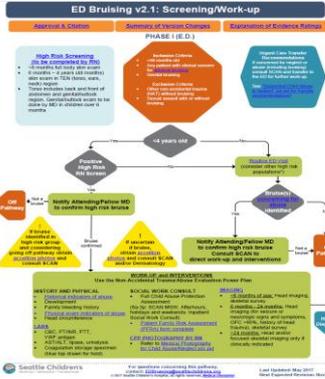
- Documented approach to management and treatment
  - Based on evidence – extensive lit review
  - Team consensus when evidence not available
- Care is hard-wired
- Outcomes are measured, and *owned by someone* to assure the continual improvement of the care for this condition

# Bruising Pathway Goals

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- Increase recognition of bruising as a sentinel injury for abuse
- Standardize the approach to identifying and working up bruises in the emergency department
- Reduce the number of missed cases of abuse
- Improve collaboration between ED and Child Protection Team

# Pathway Algorithm



## ED Bruising v2.1: Screening/Work-up

[Approval & Citation](#)

[Summary of Version Changes](#)

[Explanation of Evidence Ratings](#)

### PHASE I (E.D.)

#### High Risk Screening (to be completed by RN)

- <6 months full body skin exam
- 6 months – 4 years (48 months) skin exam in TEN (torso, ears, neck) region
- Torso includes back and front of abdomen and genital/buttock region. Genital/buttock exam to be done by MD in children over 6 months

#### Inclusion Criteria

- <48 months old
- Any patient with clinical concern for [abusive bruising](#)
- Genital bruising

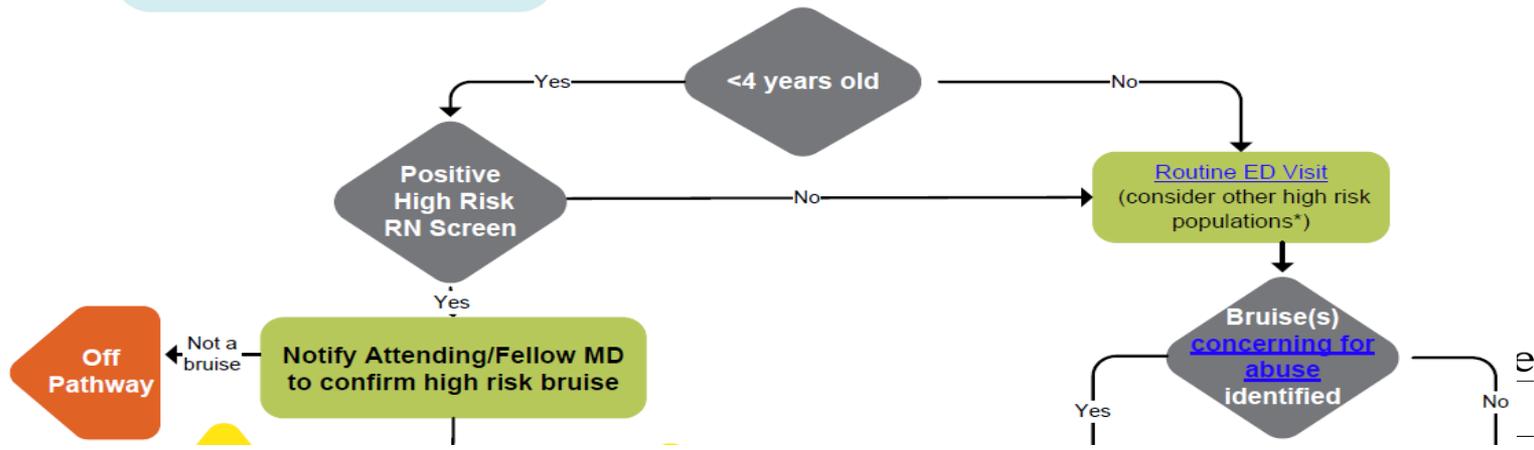
#### Exclusion Criteria

- Other non-accidental trauma (NAT) without bruising
- Sexual assault with or without bruising

#### Urgent Care Transfer Recommendations

If concerned for neglect or abuse (including bruising) consult SCAN and transfer to the ED for further work-up

See "[Suspected Child Abuse & Neglect](#)" job aid for transfer recommendations\* (for SCH only)



# CIS Clinical Decision Support Tools- EMR

- Order set required P/E fields to be filled out by the RN in Cerner

Initial Assessment

Initial Assessment

Health History

Pre-arrival Stabiliz

Vital Sign

Septic Shock Ide

Orthostatic Vital S

Pain

Pain Score

Pain Score r-FLAC

Respiratory

Respiratory Sco

Cardiovascular

Neurological

Glasgow Coma

EENT

**Integumentary**

Musculoskeletal

Gastrointestinal

Genitourinary

Treatments/Ac

### Integumentary Assessment

**Skin Assessment Norms Met**

Dry

No breakdown

No redness

No swelling

Pink or usual for ethnicity

**Skin Turgor**

Elastic

Tenting

Other:

**Skin Color**

Pink or usual for ethnicity

Ashen

Flushed

Harlequin color change

Jaundice

Meconium stained

Pallor

Ruddy

**Skin Temperature**

Hot

Warm

Cool

Cold

**Assess for bruising for patients under 48 months in the TEN region: torso (chest, abdomen, back, hip)- ears-neck. For babies under 6 months, assess the entire body.**

**High Risk RN Bruising Screen**

No bruising present in TEN region

Bruising present in TEN region

Unable to assess at this time

Urgent Care Patient - screening not required

**Skin Abnormality**

	Skin Abnormality Location	Skin Abnormality Description
Skin Abnormality #1		<MultiAlpha>
Skin Abnormality #2		<MultiAlpha>
Skin Abnormality #3		<MultiAlpha>

**Please document Wounds and Surgical Sites in their respective sections in IView.**

This varies based on age of child (if <6 months, bruising anywhere on the child)

# EMR Updates – ED White Board

## Enhanced Tracking

[SOU View for MIL](#) | [SOU All Exam Rooms \(Clinical\)](#) | [SOU PreArrivals](#) | [SOU FSC](#) | [SOU Checkout](#) | [SOU Recently Discharged](#) | [SOU To Delete](#) | [SOU Provider List](#) | [SOU RN Fee Sheets](#) | [SOU Provider Reconcil](#)  
[ED View for SEA](#) | [MIL View for SEA](#) | [SOU View for SEA](#) | [MIL All Exam Rooms \(Clinical\)](#) | [MIL PreArrivals](#) | [MIL FSC](#) | [MIL Checkout](#) | [MIL Recently Discharged](#) | [MIL To Delete](#) | [MIL Provider List](#) | [MIL RN Fee Sheet](#)  
[ED View for BCSC](#) | [SEA View for BCSC](#) | [MIL View for BCSC](#) | [SOU View for BCSC](#) | [SEA All Exam Rooms \(Clinical\)](#) | [SEA PreArrivals](#) | [SEA FSC](#) | [SEA Checkout](#) | [SEA Recently Discharged](#) | [SEA To Delete](#) | [SE](#)  
[Provider List](#) | [BCSC View for ED](#) | [SEA View for ED](#) | [MIL View for ED](#) | [SOU View for ED](#) | [BCSC All Exam Rooms \(Clinical\)](#) | [BCSC PreArrivals](#) | [BCSC FSC](#) | [BCSC Checkout](#) | [BCSC Recently Discharged](#) | [BCS](#)  
[ED All Beds \(Clinical\)](#) | [ED Central](#) | [ED East](#) | [ED West](#) | [ED MHE](#) | [ED Assigned](#) | [ED SeaStar 5](#) | [ED MA 6](#) | [ED PreArrivals](#) | [Initial Assessment](#) | [Recently Admitted](#) | [Recently Discharged](#) | [Admits & Potential Adm](#)

Avg LOS: 2:56 Median LOS: 1:59 Total: 41 WR: 6

Add Order Patient Summary Report Filter: <None>

Room	Be	Bed	C	Ac	ISO	Is	LOS	Name	A/S	Psy	Safety	Alerts	Visit Reason	ATT	FEL	RS/RN	RT	PA	PN	Seps	What's Next	Event
04,1		W2		4.1	STOP		S 1:24	[REDACTED]	9 ye		Yes*		flu, r/o dehydration	VC8	EM9	Meg		PCF		0*		7 I
05,1		W2		3.1	STOP		C 2:04	[REDACTED]	6 ye		Yes*	C	vomiting/ increased	VC8	KH9	KIM				0*	zofran, neuro	I
06,1		W2		4.1	STOP		S 2:07	[REDACTED]	19 n		Yes*		neck pain	VC8	Joh	Meg		PCF			midaz@1410, ice pa	
07,1		W2		4.1	STOP-STOP		S 2:41	[REDACTED]	2 ye		Yes*		decreased po	VC8	Emi	KIM					tyl@1420, PO > hom	I
09,1		W2		4.1	STOP		S 2:45	[REDACTED]	11 y		Yes*		headache, difficulty	VC8	EM9	KIM				0*	home	I
10,1		W2		4.1	STOP		S 1:39	[REDACTED]	17 n		Yes*		cough, runny nose9	VC8		Meg						
11,1		W2						[REDACTED]														
12,1		W1		3.1			S 2:36	[REDACTED]	13 y		Yes*		dizzy/nauseus	VC8	KH9	Tiff				1*	spanish, ct done	
14,1		W1		2.1			S 4:06	[REDACTED]	10 y		Yes*		flank pain	VC8	Emi	Gin		Hen		2*	need bed	7
15,1		W1		3.1	STOP		S 0:27	[REDACTED]	3 ye		Yes*		abd pain, diff breath	VC8		Gin				2*	RS9	
16,1		W1		3.1			S 1:28	[REDACTED]	5 ye		Yes*		uti	SA	Mik	Tiff		PCF		0*	ua	
17,1		W1		3.1	STOP		S 3:39	[REDACTED]	9 ye		Yes*	C	vomiting	VC8	Mik	Tiff		PCF			ORT, urine sent	
18,1		W1		3.1			S 1:58	[REDACTED]	13 y		Yes*		concussion	AS9	Mik	Gin					ibuprofen	7
19,1		W1						[REDACTED]														
20,1		W1		2.1	STOP		S 4:14	[REDACTED]	2 ye		Yes*	C	resp distress	VC8	Mik	Gin	Ali				RN to call back	
21,1		E1		3.1	STOP		S 5:20	[REDACTED]	2 ye		Yes*	B	resp distress	AS9	Mik	Wil	Ali			1*	rescore @ 1515, hok	
22,1		E1		3.1	STOP		S 1:31	[REDACTED]	9 ye		Yes*		abd pain	SA	Sus	Mar		PCF		0*	ua	7
23,1		E1		3.1			0:41	[REDACTED]	6 ye		Yes*	C	chi	SA	Alex	Nat	Wil		PCF	1*	obs, d/w swedish ne	
24,1		E2		4.1			S 1:02	[REDACTED]	2 ye		Yes*		chi	SA		Pau						
25,1		E2		4.1			S 0:57	[REDACTED]	9 ye		Yes*		noseblee			Pau						



# Tracking the metrics through Tableau

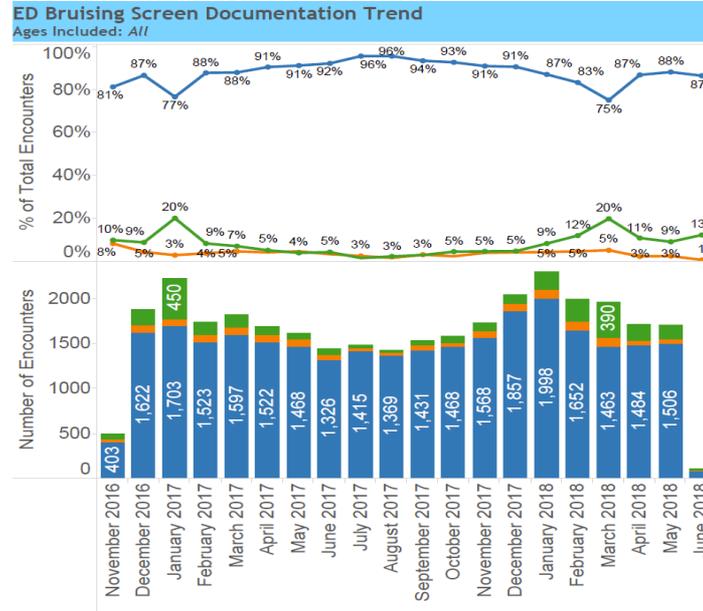
ED Bruising Screening Documentation			
Ages Included: All			
	FY 2017	FY 2018	Total
Screened	15,379 89.0%	13,093 86.8%	28,472 88.0%
Screening Not Documented	675 3.9%	600 4.0%	1,275 3.9%
Documented: Unable to assess at this time	1,281 7.4%	1,450 9.6%	2,731 8.4%
<b>Grand Total</b>	<b>17,285 100.0%</b>	<b>15,086 100.0%</b>	<b>32,371 100.0%</b>

**CSW Implementation Status**  
 PostImplementation

Show Bruise Screen Responses:  
 Screening Not Documented  
 Documented: Unable to assess at this time  
 Screened

Age Screen Group  
 Between 6-48 mos  
 Under 6 mos

ED Bruising Screening Assessment			
Ages Included: All			
	FY 2017	FY 2018	Total
Bruising Present	260 1.7%	194 1.5%	454 1.6%
No bruising present	15,120 98.3%	12,901 98.5%	28,021 98.4%
<b>Grand Total</b>	<b>15,379 100.0%</b>	<b>13,093 100.0%</b>	<b>28,472 100.0%</b>



**AIM: 95% of patients under 48 months of age in the ED will be screened for bruising by TBD**  
 Numerator/denominator: all ED patients screened/all ED patients <48 months -may exclude "Unable to assess at this time."

Age Screen Group  
 Between 6-48 mos  
 Under 6 mos

Show Bruise Screen Responses:  
 Screening Not Documented  
 Documented: Unable to assess at this time  
 Screened

Bruise Screen Response (group)  
 Documented: Unable to assess at this time  
 Screening Not Documented  
 Screened

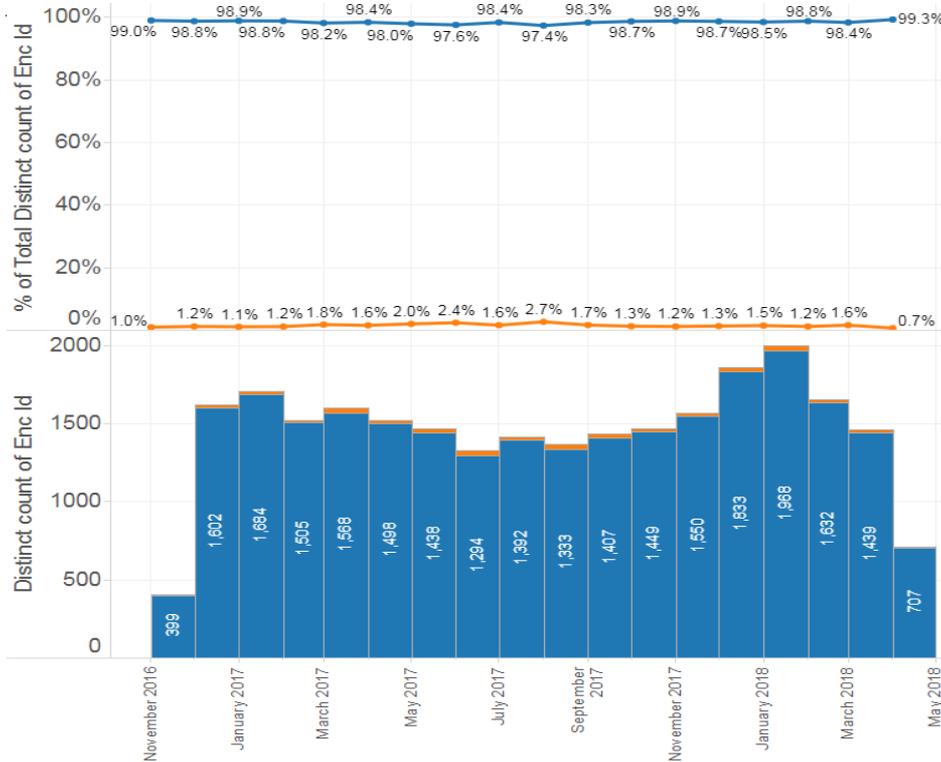


ED Bruising CSW Metrics/Bruise Screen AIM

28,472 children screened since implementation (18 months)  
 Screening rate ~88%



# Metrics – positive screen



- Out of 28,000 cases, 402 children (1%) screened positive for high risk bruise since go live.

**Bruise Screen Assessment**  
 Bruising Present  
 No bruising present

# Summary

- 
- Child abuse is a significant problem and it is under recognized by physicians
  - Informatics can be used for screening to improve the recognition of child abuse
  - Analytics can help track our Clinical pathways to ensure standards are being followed and to measure clinical effectiveness

# Be Brave!

## Thank You



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- **A Brave New World**
  - Reza Sadeghian, MD, Clinical Informatics Fellow, University of Washington