

# Orthopedic Injury Coding

Bryant Oliphant  
10:20



# Orthopaedic Trauma in MTQIP

Bryant Oliphant, MD, MBA, MSc

Research Investigator

bryantol@med.umich.edu

 @BonezNQuality

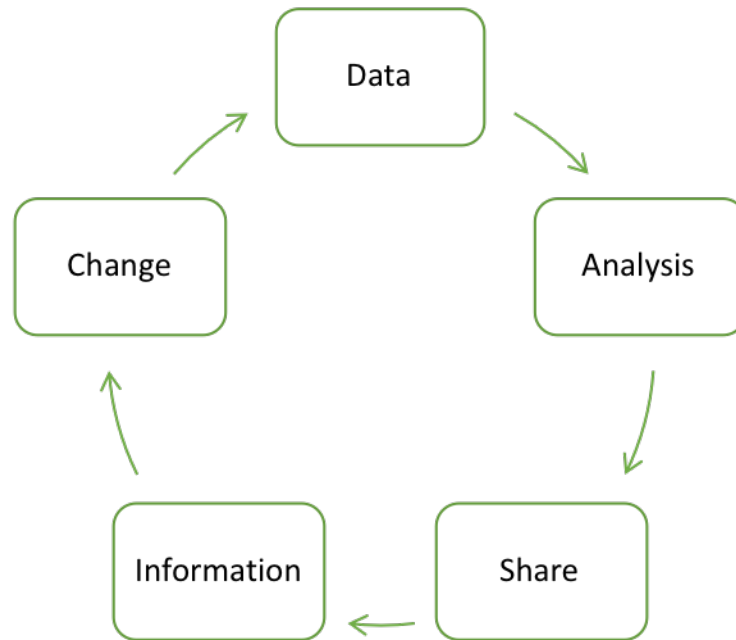
# Disclosures

- None

# Goal of collaboratives



# Collaborative



# But it's easy, right?

- Data mining
- Simple papers

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ORIGINAL ARTICLE

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In-hospital mortality from femoral shaft fracture depends on the initial delay to fracture fixation and Injury Severity Score: A retrospective cohort study from the NTDB 2002–2006

Robert Victor Cantu, MD, MS, Sara Catherine Graves, MD, MS,  
and Kevin F. Spratt, PhD, Lebanon, New Hampshire

## Delayed Internal Fixation of Femoral Shaft Fracture Reduces Mortality Among Patients with Multisystem Trauma

By Saam Morshed, MD, MPH, Theodore Miclau III, MD, Oliver Bembom, PhD, Mitchell Cohen, MD, M. Margaret Knudson, MD, and John M. Colford Jr., MD, PhD

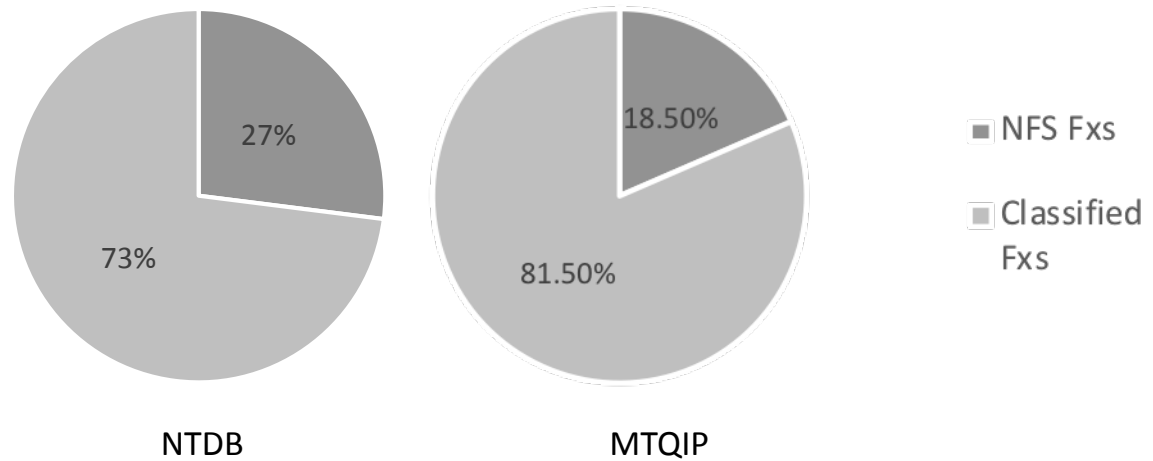
	MTQIP		NTDB	
Fracture	% Specified	% Not Further Specified	% Specified	% Not Further Specified
Pelvic Ring	76.58	23.42	65.53	35.47
Acetabulum	61.07	38.93	46.32	53.68
All Femur	88.14	11.86	87.14	12.86
Proximal Femur	96.50	3.50	94.03	5.97
Femoral Shaft	65.72	34.28	97.18	2.82
Distal Femur	65.17	34.83	96.26	3.74
All Tibia	63.17	36.83	54.49	45.51
Proximal Tibia	78.92	21.08	72.40	27.60
Tibial Shaft	73.05	26.95	66.06	33.94
Distal Tibia	51.72	48.28	47.89	52.11
Talus	42.68	57.32	42.74	57.26
Calcaneus	42.42	57.58	42.40	57.60
Navicular	32.14	67.86	31.60	68.40
Clavicle	75.13	24.87	56.31	43.69
Scapula	54.01	45.99	49.04	50.96
Proximal Humerus	72.74	27.26	64.09	35.91
Humerus	93.12	6.88	89.46	10.54
Radius	97.58	2.42	93.96	6.04
Ulna	96.25	3.75	91.65	8.35

# MTQIP vs. NTDB

	MTQIP	NTDB
All Fractures	70,918	1,269,278
All NFS Fractures	13,116	342,472
Overall percentage NFS	18.5%	27%



# NTDB vs. MTQIP



# MTQIP

Level 1		Level 2	
Total Fractures	NFS Fractures	Total Fractures	NFS Fractures
29,122	6,187	41,796	6,929
21.2% NFS		16.6% NFS	

**\*p < 0.001**

# MTQIP

Simple		Complex	
Total Fractures	NFS Fractures	Total Fractures	NFS Fractures
45,529	4,350	25,389	8,766
9.6% NFS		34.5% NFS	

**\*p < 0.001**

# NTDB

Simple		Complex	
Total Fractures	NFS Fractures	Total Fractures	NFS Fractures
722,212	113,526	547,066	228,946
15.7% NFS		41.8% NFS	

**\*p < 0.001**

# Ranking of Sources of Injury Information

- Medical Examiner/Autopsy Reports
- Hospital/Medical Records
  - Autopsy Reports
  - Operative Reports → *Gobbledygook*
  - Radiology Reports
  - Nursing or ICU Notes
  - Physician Progress Notes
  - ED Record
  - Discharge Summary
  - Face Sheet
- “Field Records”
  - Ambulance Run Sheets
  - Police Reports
- Bystander
- Patient (esp. LOC)



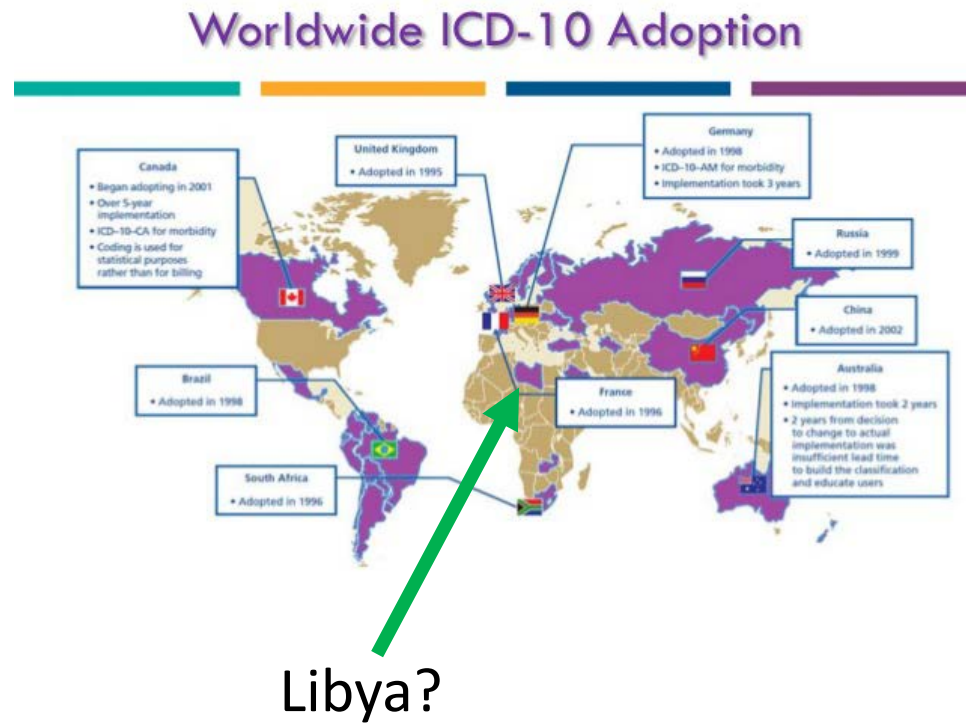
Highest

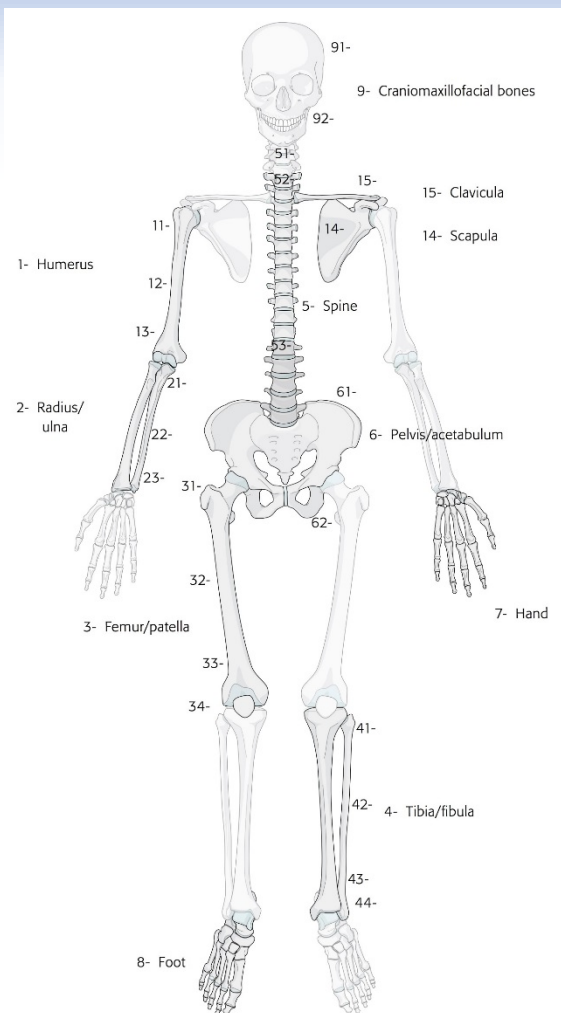
Level of General Reliability  
Completeness of Detail










Lowest

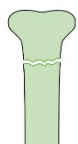
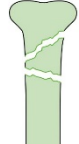

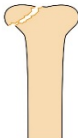
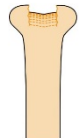
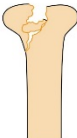
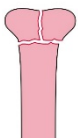
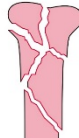

# Orthopaedic Classification Systems

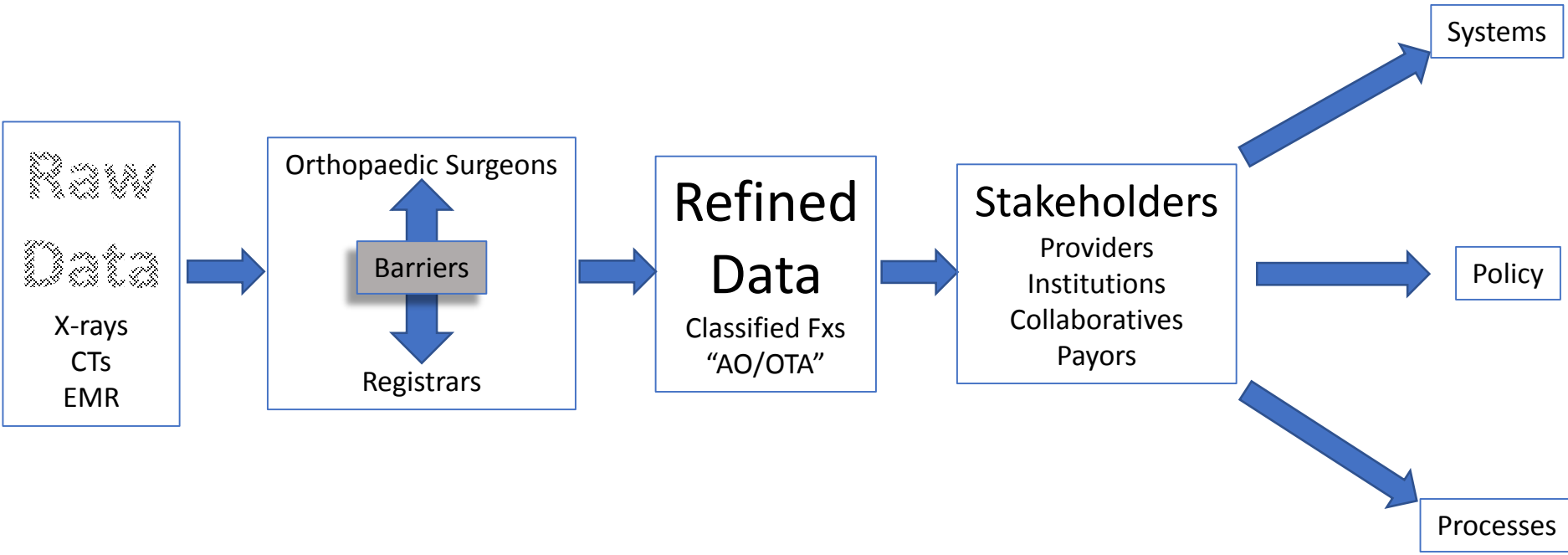
- ICD 9 → 10
- AIS2005
- Not AO/OTA
- Unspecified?
- Not Further Specified?





Type	Group		
	1	2	3
A Simple			
	Spiral	Oblique	Transverse
B Wedge			
	Spiral	Bending	Multifragmentary
C Complex			
	Spiral	Segmental	Irregular

Type	Group		
	1	2	3
A Extraarticular			
	Simple	Wedge	Complex
B Partial articular			
	Split	Depression	Split-depression
C Articular			
	Simple articular, simple metaphyseal	Simple articular, complex metaphyseal	Complex articular, complex metaphyseal





# ICD9 – Pelvis

- 808 Fracture of Pelvis
  - 808.4 Closed fracture of other specified part of pelvis
    - 808.43 Multiple closed pelvic fractures with disruption of pelvic circle
    - 808.44 Multiple closed pelvic fractures without disruption of pelvic circle
    - 808.49 Closed fracture of other specified part of pelvis
  - 808.8 Closed unspecified fracture of pelvis

# ICD9 – Pelvis

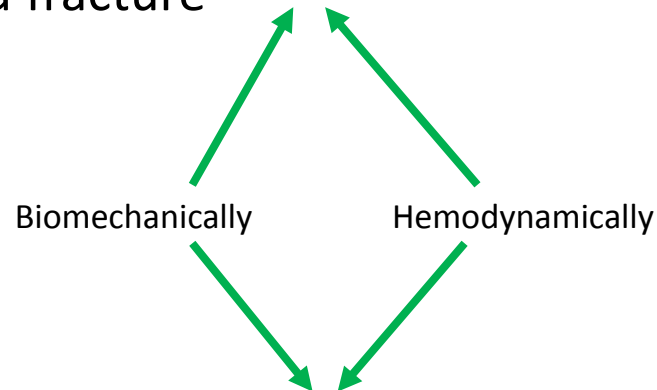
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# ICD10 – Pelvis

- [S32.810A](#) Multiple fractures of pelvis with stable disruption of pelvic ring, initial encounter for closed fracture
- [S32.811A](#) Multiple fractures of pelvis with unstable disruption of pelvic ring, initial encounter for closed fracture

# ICD10 – Pelvis

- [S32.810A](#) Multiple fractures of pelvis with **stable** disruption of pelvic ring, initial encounter for closed fracture

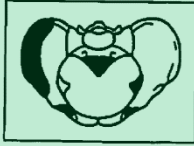

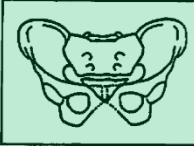
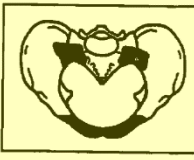
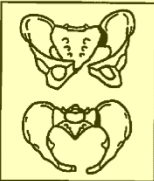
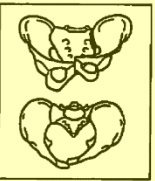
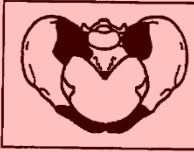

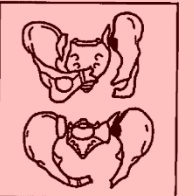


- [S32.811A](#) Multiple fractures of pelvis with **unstable** disruption of pelvic ring, initial encounter for closed fracture

## AIS2005 – Pelvis

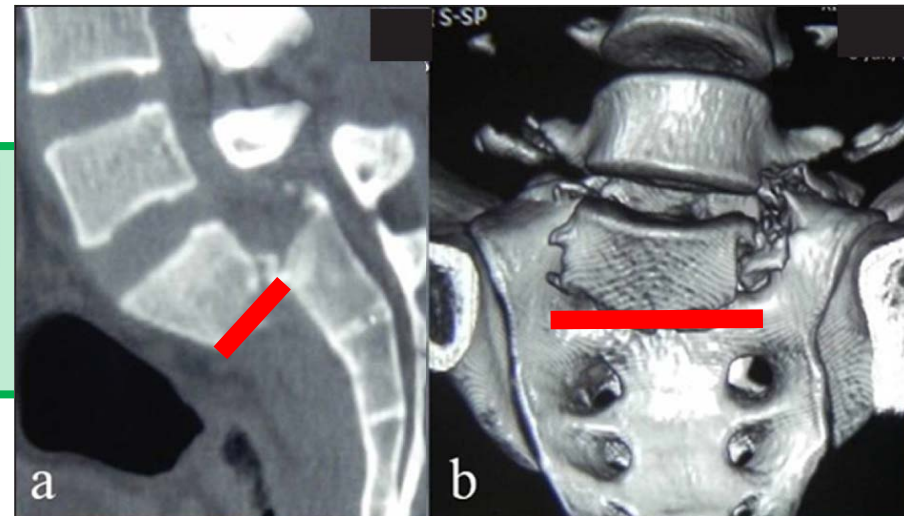
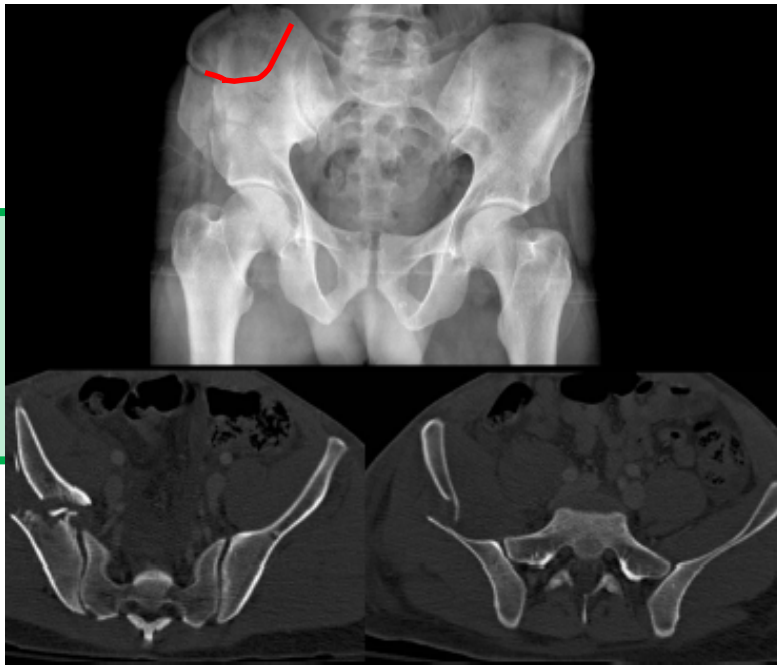
*To the extent possible, **the coder (registrar)** should seek information about the stability or instability of the fracture, described as follows, in assigning an AIS code.*

# AIS2005

Stable	<p>Types: Fracture, posterior Arch intact</p> 	<p>Examples: Innominate bone Avulsion fracture</p> 	<p>Transverse fracture Sacrum and coccyx</p> 
Partially Stable	<p>Fracture, incomplete Disruption of Posterior arch</p> 	<p>Unilateral, "open Book" fracture</p> 	<p>Unilateral, lateral Compression fracture</p> 
Unstable	<p>Fracture, complete Disruption of Posterior arch</p> 	<p>Vertical Instability</p> 	<p>Bilateral, complete Pelvic floor disruption</p> 

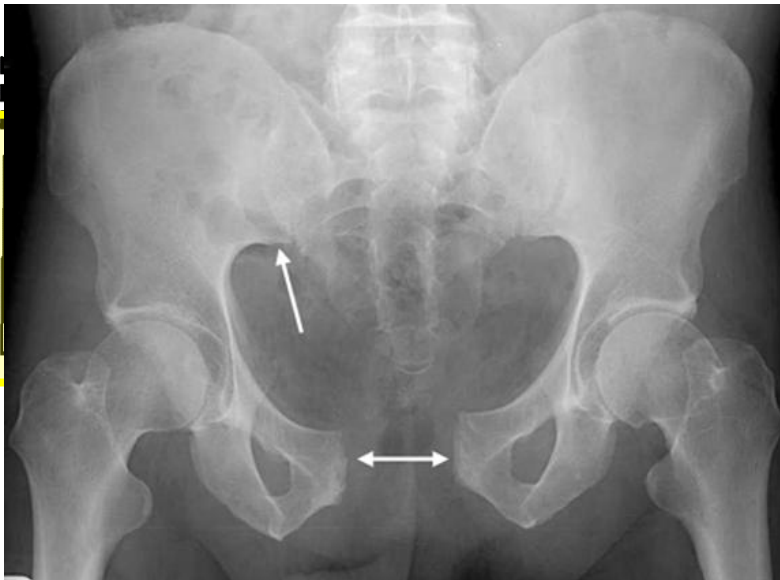
# Stable – Tile A Type

- Fracture not involving the posterior arch; pelvic floor intact and able to withstand normal physiological stresses without displacement.

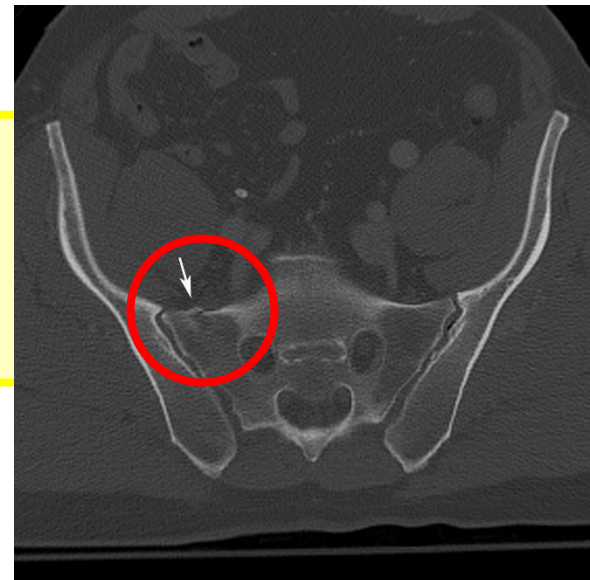


## Partially Stable – Tile B Type

- Posterior osteoligamentous integrity partially maintained and pelvic floor intact.



*Operative*



*Non-operative*



APC2 (Operative)

LC1 (Non-operative)

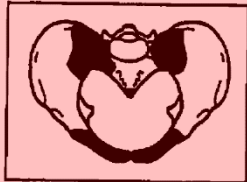


Pelvic ring fracture (AIS2005):  
Incomplete disruption of posterior arch

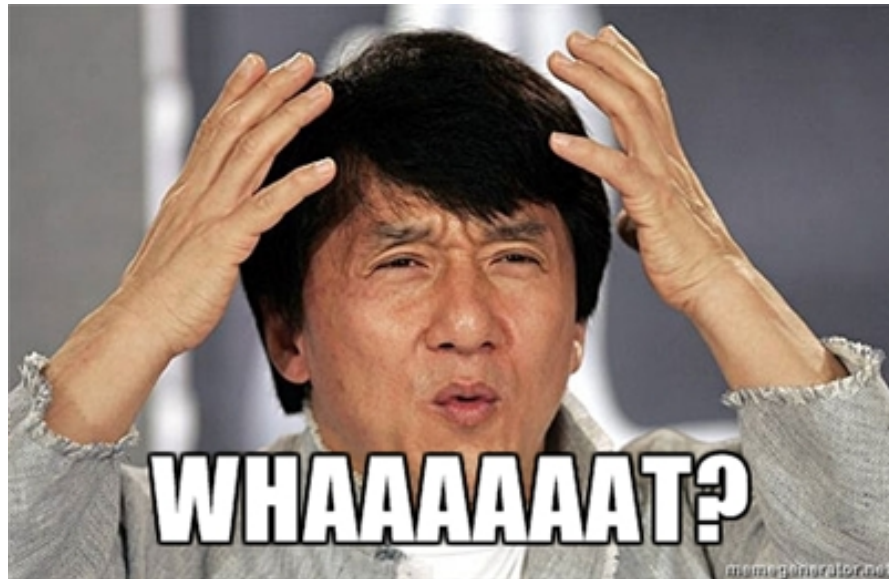
# Unstable – Tile C Type

- Complete loss of posterior osteoligamentous integrity; pelvic floor disrupted.

Fracture, complete  
Disruption of  
Posterior arch



Confused?



# All Pelvic Ring Injuries

Type of Injury	Number	Percent
Unspecified	1,072	15.87
Stable (Tile A)	3,915	57.96
Partially Stable (Tile B)	1,426	21.11
Unstable (Tile C)	342	5.06
<b>Total</b>	<b>6,755</b>	<b>100</b>

# Type of Injury and Treatment

	Non-operative	Ex-Fix	ORIF	Ex-Fix & ORIF	Total
NFS	931	10	118	13	1,072
Stable	3,443	32	407	33	3,915
Partially Stable	765	43	506	112	1,426
Unstable	97	14	161	70	342

Ex-Fix = External Fixator

ORIF = Open Reduction Internal Fixation

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# How Accurate are we in Classifying?

- 235 patients – Traumatologist vs. NTDB registry
- All pelvic ring injuries
- Disagreement
  - 76% intact posterior ring
  - 57% incomplete posterior ring injury
- Underclassified in registry
  - 76% intact posterior ring
  - 48% incomplete posterior ring injury

Haws et al. J Orthop Trauma, 2015 vol. 29 (10) pp. 460-462

# Data in Trauma Surgery Registries

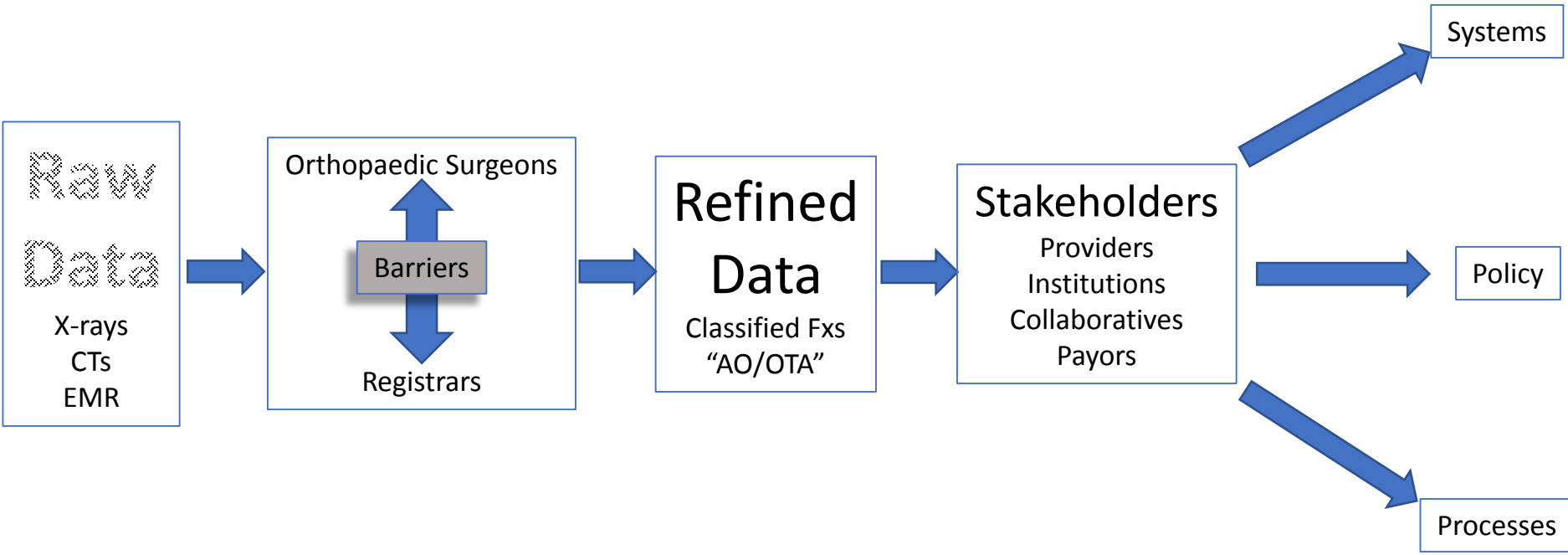
- 50 registrars across level 1 and 2 centers
- 64% accuracy of coding a fictitious case
- “...cast doubt on the validity of registry data”

Arabian et al. J Trauma Acute Care Surg, 2015 vol. 79 (3) pp. 359-363

- Systematic Review of quality of data
- Trauma registry quality = completeness of data
  - Not accuracy, precision, consistency, correctness

Porgo et al J Trauma Acute Care Surg, 2016 vol. 80 (4) pp. 648-658





Where can we go from here

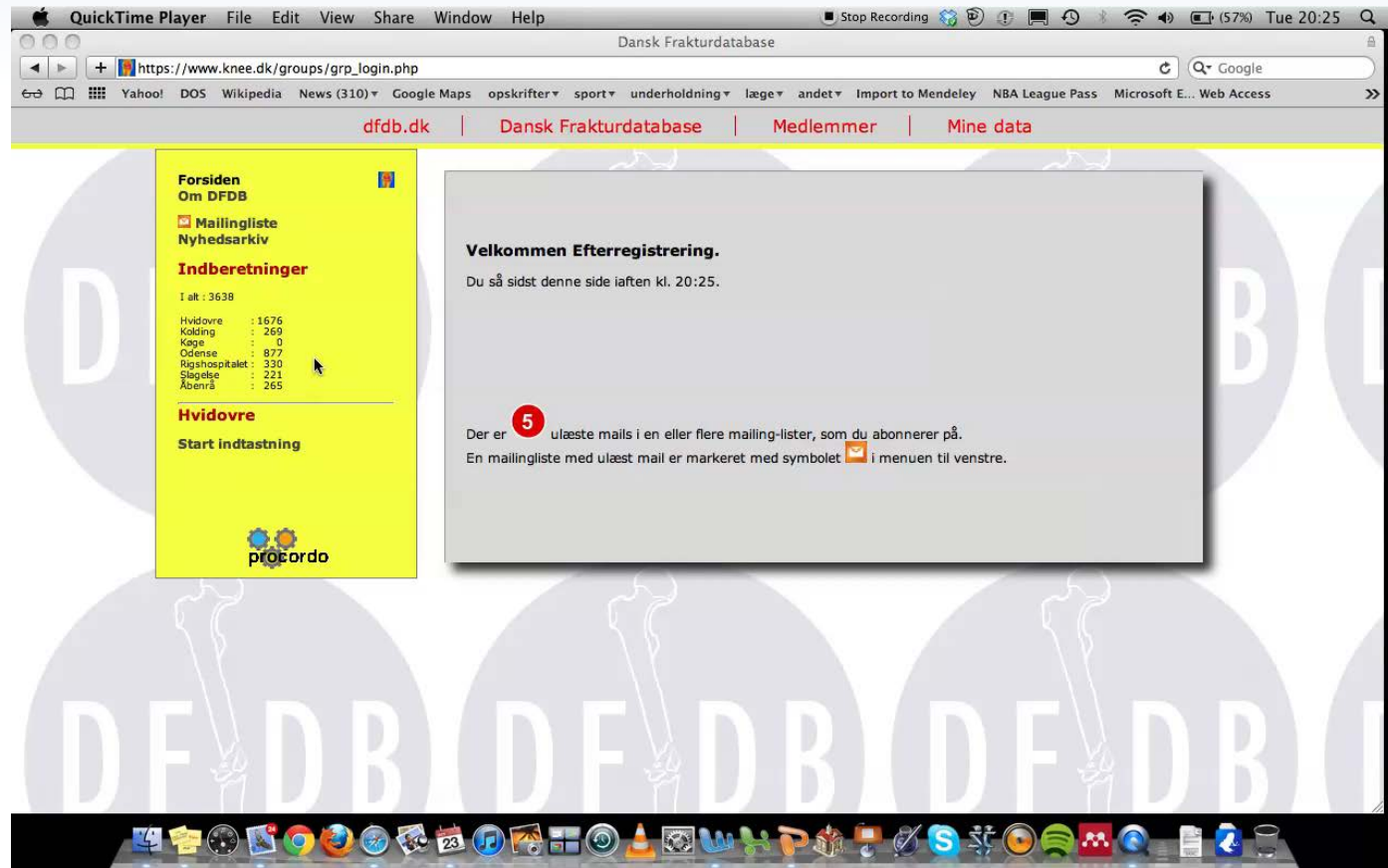
# Registries (Arthroplasty)

- Scandanavia – Started in the 1970s
- Kaiser – 90% participation, ~99% accurate
- MARCQI

# Can we make a registry?

- Where are the details we need/want?
- Improve the data we collect
- Coordinate MI Centers







# Danish Fracture DataBase



- 2 min per registration
- To be completed by the surgeon immediately after surgery
- Patient, trauma and surgery related factors are recorded
  - AO/OTA Fracture classification
  - Procedure(s) performed
  - Implant(s) used
- Reoperations are linked to primary interventions

Kirill Gromov, MD, PhD, (e-mail: [kirgromov@yahoo.dk](mailto:kirgromov@yahoo.dk))



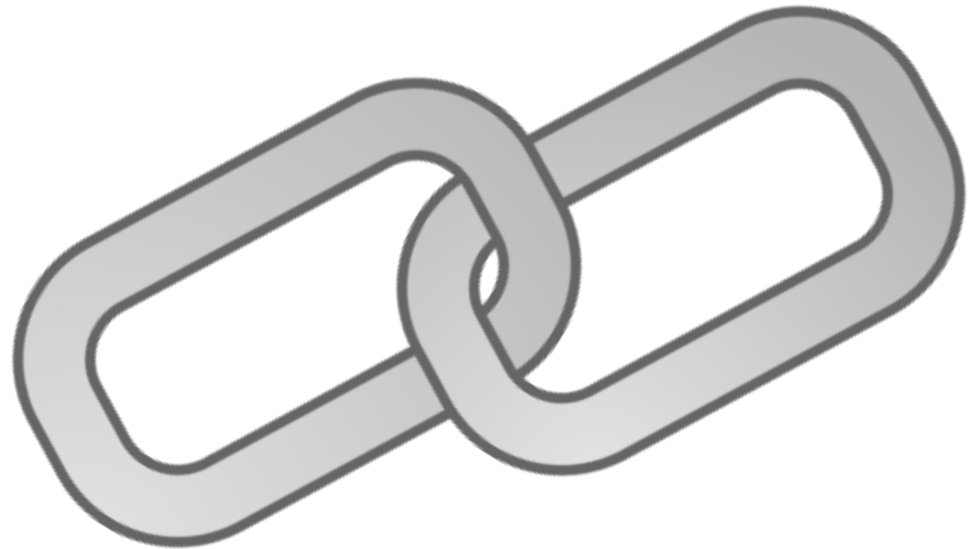
# Danish Fracture DataBase



- Total 387 fracture-related operations in the validation period
- Total completeness of 83%
- 89% of primary operations and 78% of reoperations were recorded

# Can we link long-term outcomes?

- Between hospital course and recovery
- MTQIP + MHA = Better Picture
- More complete record





# Move Away From The Big Brother Mindset



# Conclusions

- MTQIP has improved trauma care in the state!!!
- If we want to have a great system, we (ortho) need to put in the effort
- We have the opportunity to make something spectacular

# Thank you

Bryant Oliphant, MD, MBA, MSc

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 @BonezNQuality