Condition Coding Practice Differences Between USA, Asia and Europe: Preliminary Results from European Birth Season – Disease Risk Study

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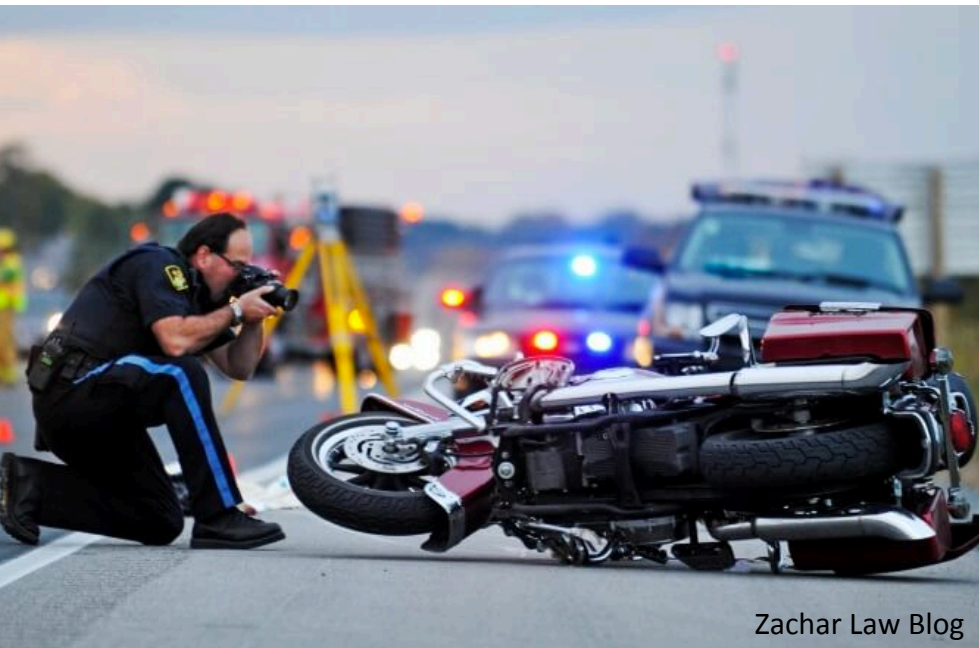Children's Hospital of Philadelphia

OHDSI
Bethesda, MD
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What Do These Have in Common?

V23 Codes
In ICD Terminology

Zachar Law Blog

Hello Magazine

ICD-10

ICD-9

Difference Based on Version

SNOMED CT

The global
language of
healthcare

All Terminologies Mapped to SNOMED

ICD 10 encoded source

Code	Text
J45.9	Asthma, unspecified
S72.0	Fracture of neck of femur
E84.9	Cystic fibrosis, unspecified
E06.3	Auto-immune thyroiditis

ICD 9 encoded source

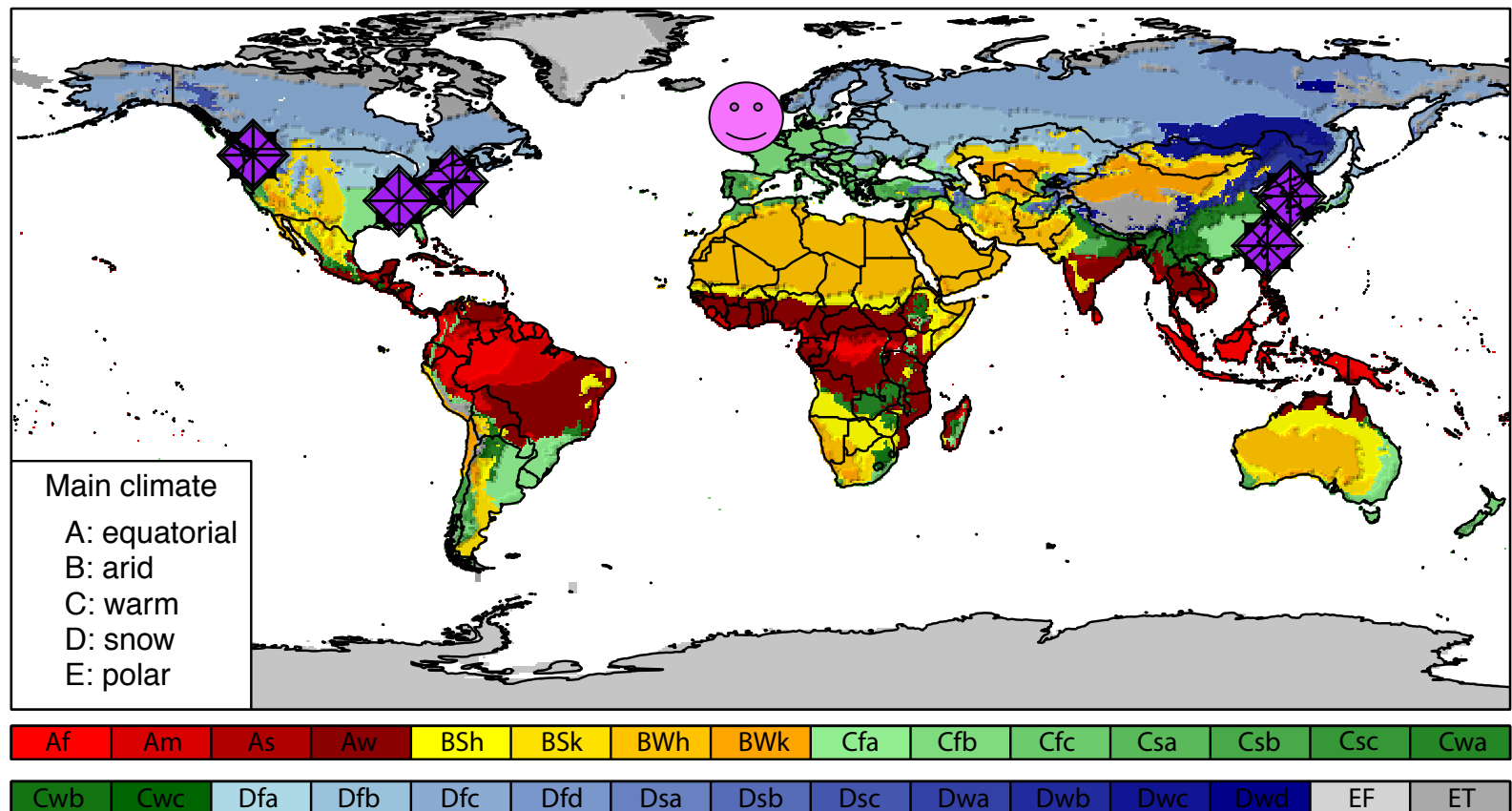| Code	Text
493.9	Asthma unspecified
011.2	Tuberculosis of lung with cavitation
277.0	Cystic fibrosis
244.9	Unspecified acquired hypothyroidism
255.0	Cushing's syndrome

SNOMED CT

ID	Description
195967001	Asthma
190905008	Cystic fibrosis
5913000	Fracture of neck of femur
21983002	Hashimoto thyroiditis
40930008	Hypothyroidism
154705004	Cushing's syndrome
186177005	Tuberculosis of lung with cavitation

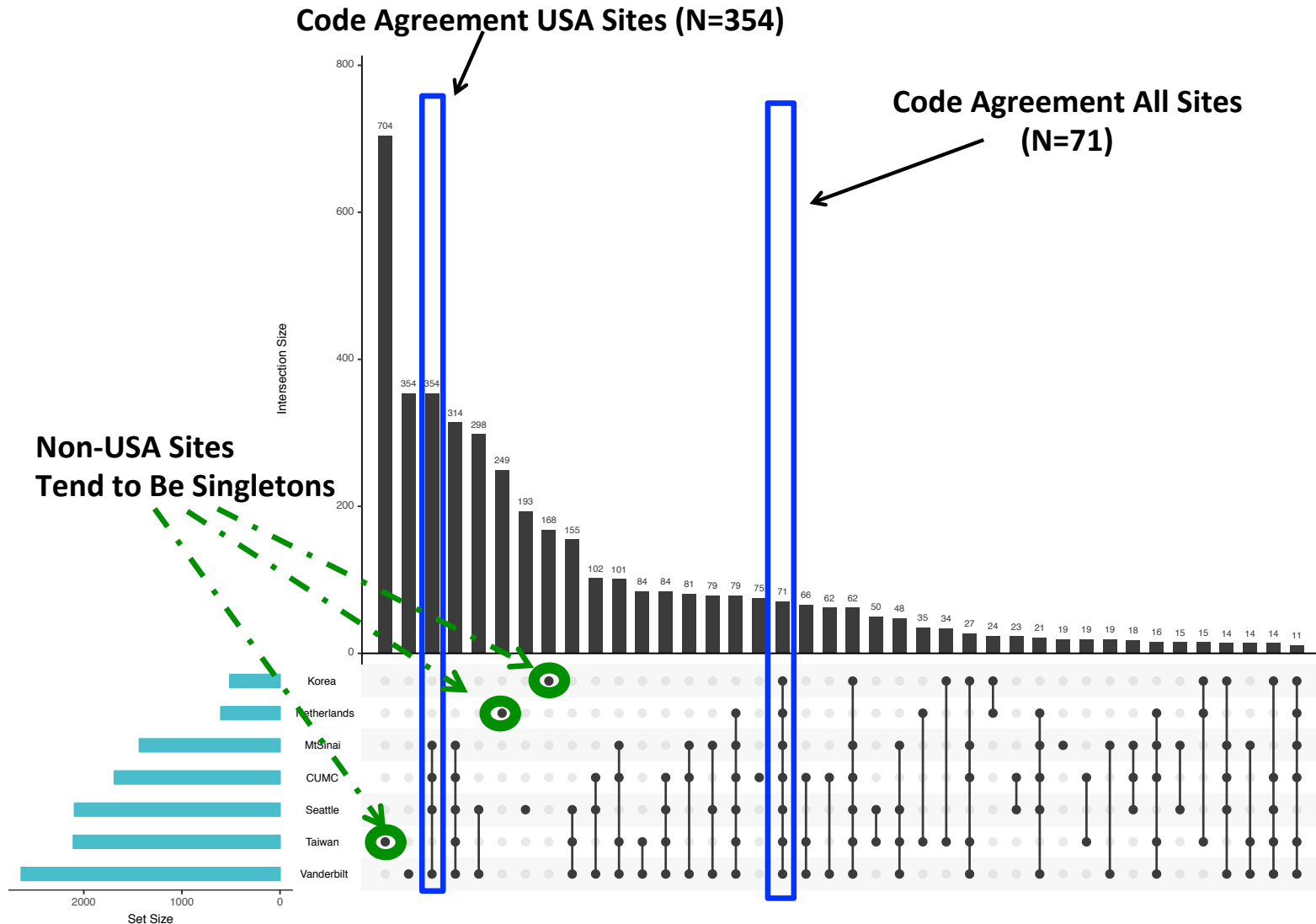https://confluence.ihtsdotools.org/display/DOCANLYT/5.2+Mapping+Other+Code+Systems+to+SNOMED+CT

Includes Terminologies from Across the Globe

What Happens When You Add Another Site?

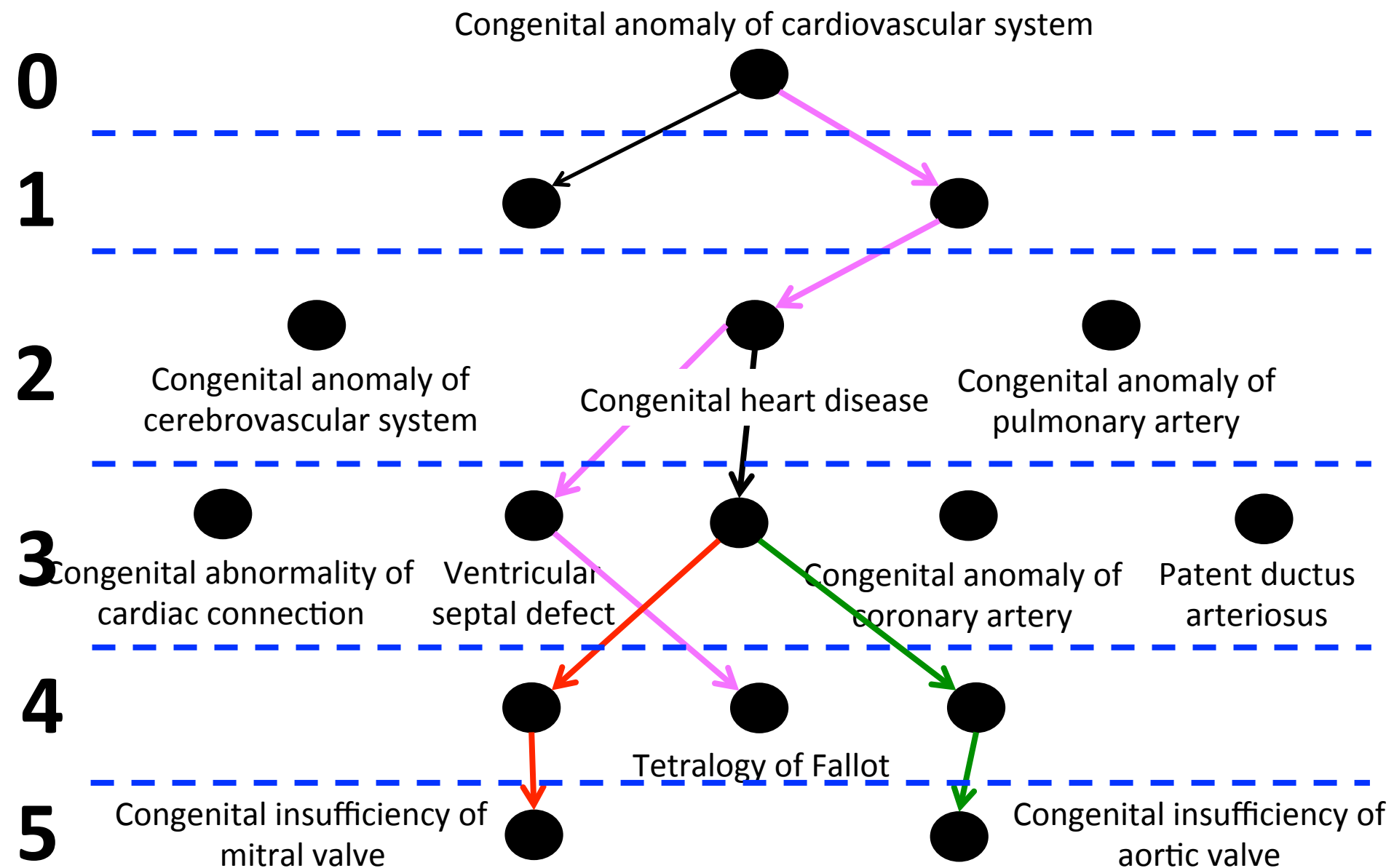**Global – SeaWAS Collaborator Sites**

Differences Still Persist Across Sites

Code Agreement USA Sites (N=354)

Code Agreement All Sites (N=71)
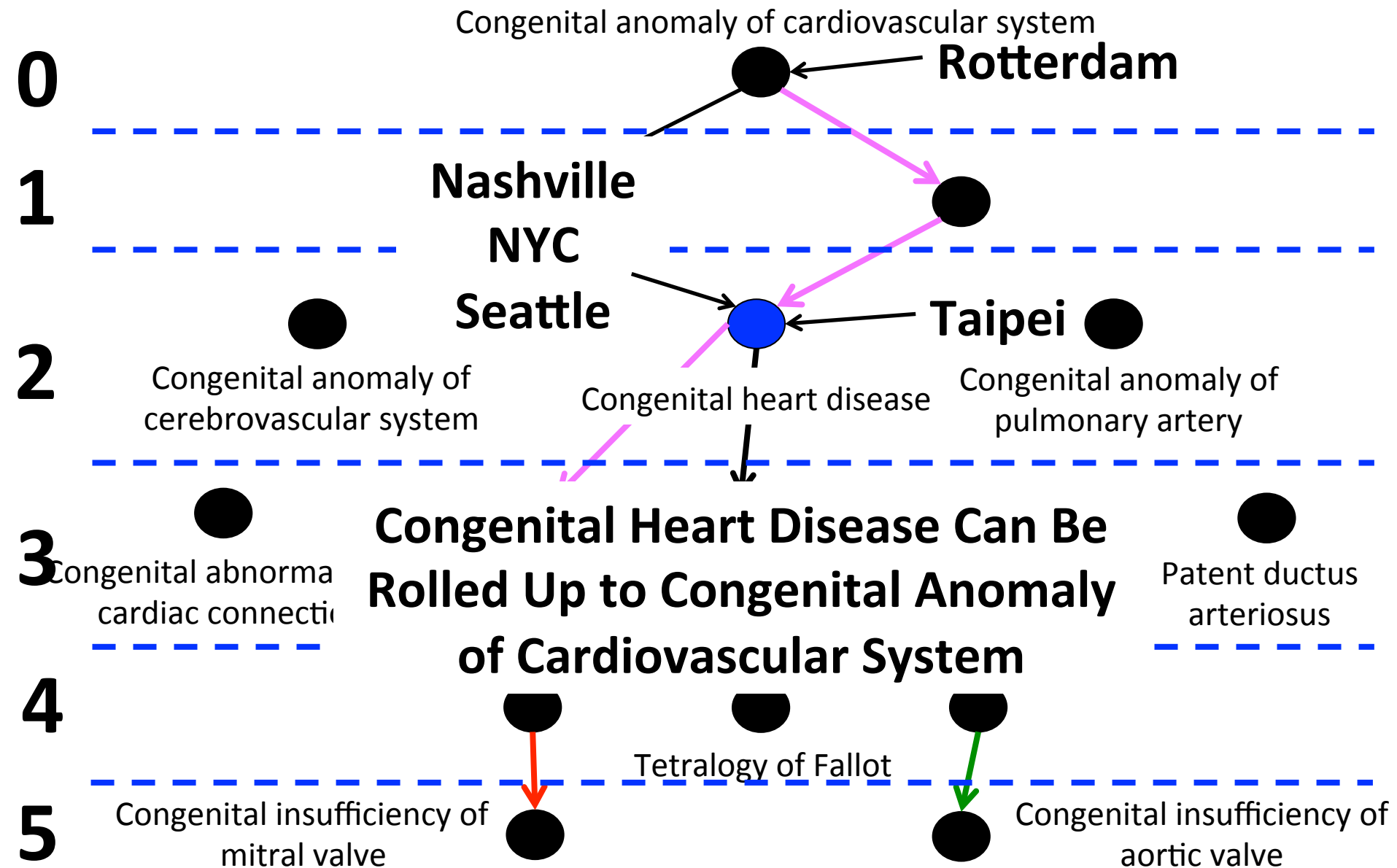
Non-USA Sites Tend to Be Singletons

Caveats of EHR data

- 4340 unique condition concepts were found across 7 sites

- 4238 out of 4340 were mapped to standard terminologies

- We can leverage the concept ancestor:

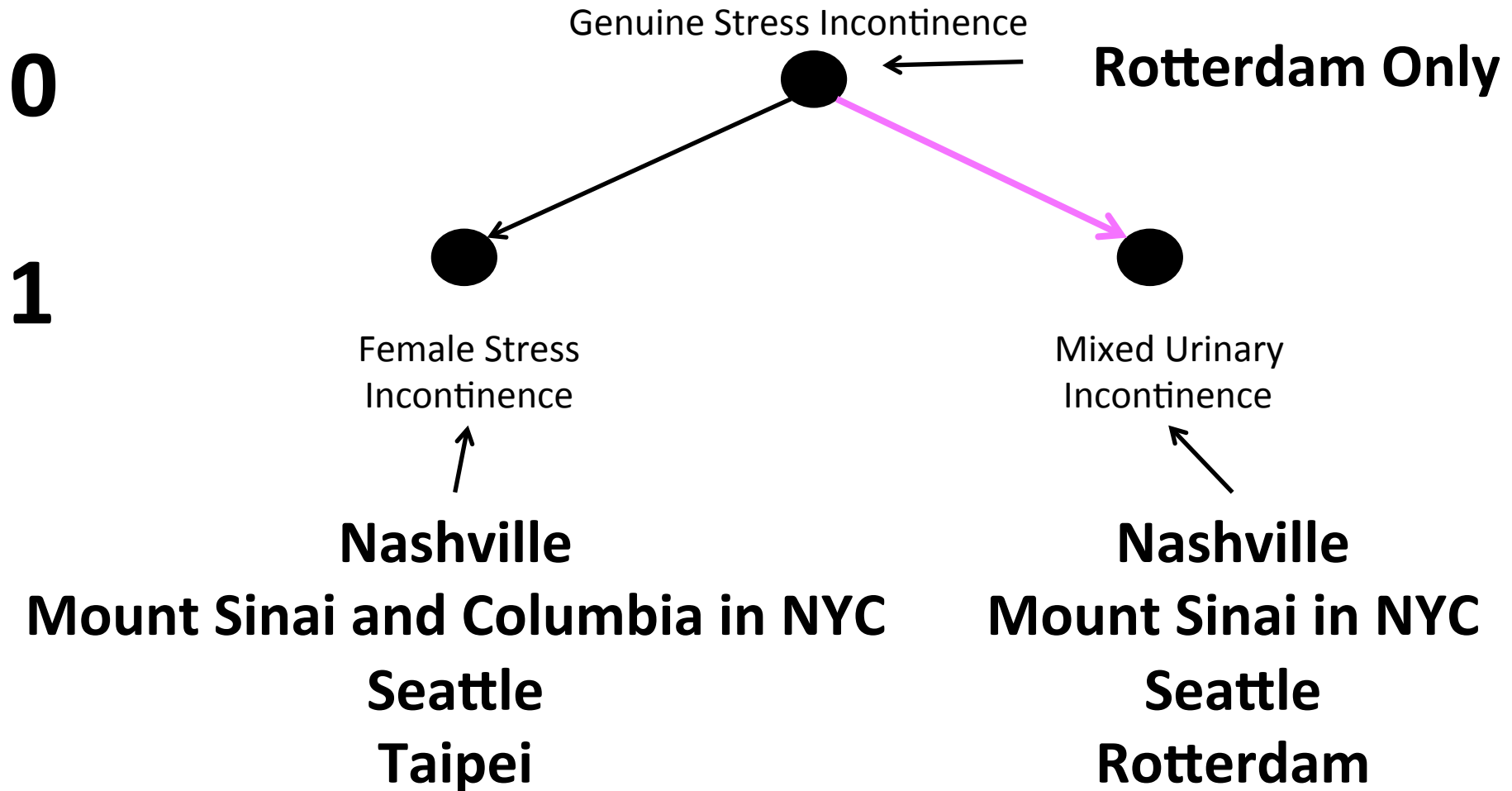- 243 / 249 unique Netherlands concepts were in the concept ancestor file

Concept Map SNOMED

0

Congenital anomaly of cardiovascular system

1

2

Congenital anomaly of cerebrovascular system

Congenital heart disease

Congenital anomaly of pulmonary artery

3

Congenital abnormality of cardiac connection

Ventricular septal defect

Congenital anomaly of coronary artery

Patent ductus arteriosus

4

Tetralogy of Fallot

5

Congenital insufficiency of mitral valve

Congenital insufficiency of aortic valve

Highest Level At Different Sites

0

Congenital anomaly of cardiovascular system

Rotterdam

1

Nashville
NYC
Seattle

2

Taipei

Congenital anomaly of cerebrovascular system

Congenital heart disease

Congenital anomaly of pulmonary artery

3

Congenital abnormal cardiac connection

Congenital Heart Disease Can Be Rolled Up to Congenital Anomaly of Cardiovascular System

Patent ductus arteriosus

4

5

Tetralogy of Fallot

Congenital insufficiency of mitral valve

Congenital insufficiency of aortic valve

Some Concepts Can Be Mapped

0

Genuine Stress Incontinence

← **Rotterdam Only**

1

Female Stress
Incontinence

Nashville
Mount Sinai and Columbia in NYC
Seattle
Taipei

Mixed Urinary
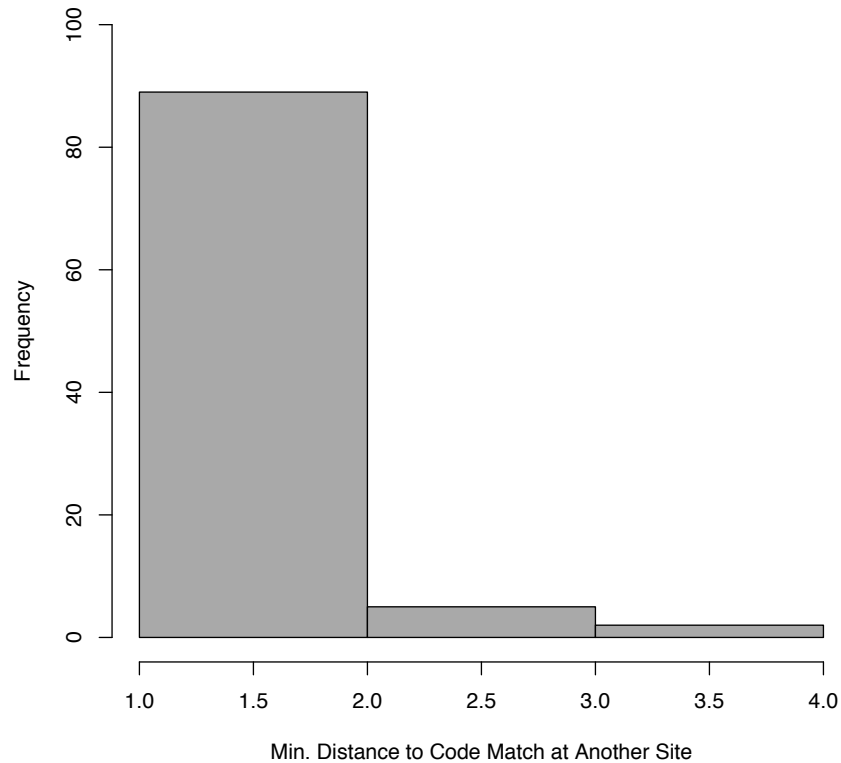Incontinence

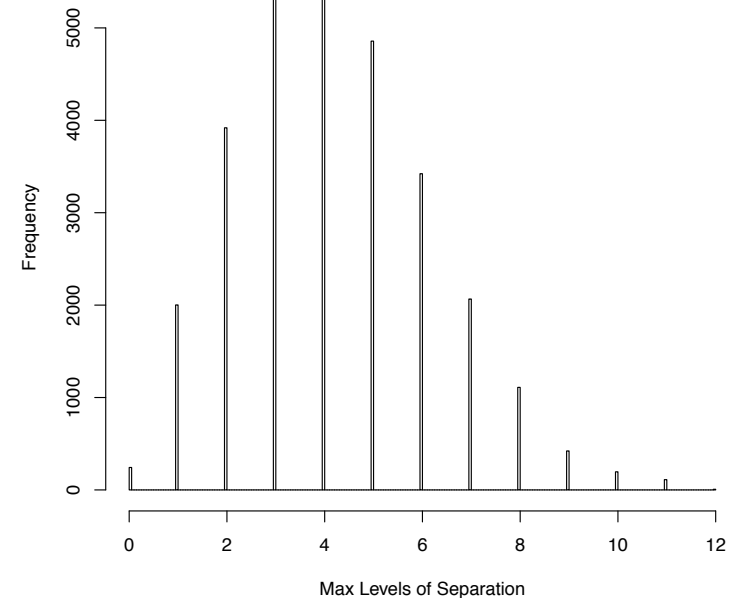**Nashville**
Mount Sinai in NYC
Seattle
Rotterdam

Suwon did not use the term, or it was infrequently used

Caveats of EHR data

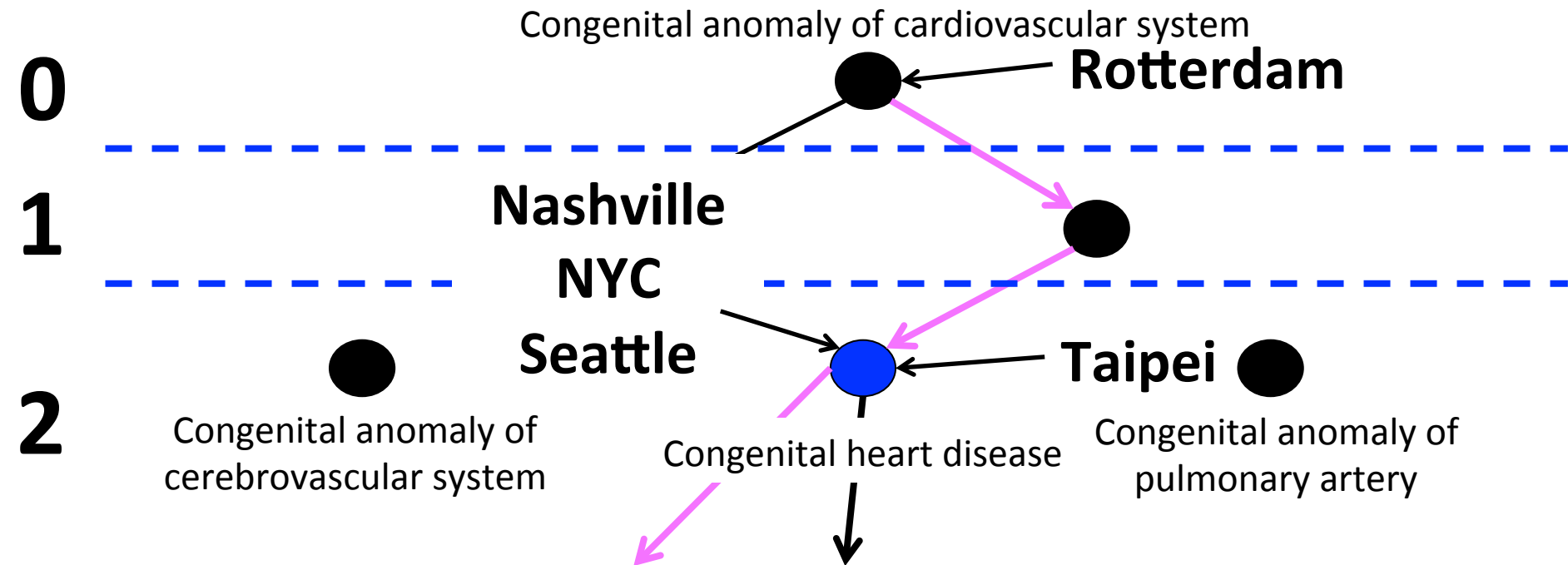**Min Code Distance for 96 /235 Concepts with a Match at Another Site**

Max Code Separation from 243 Unique Netherlands Concept IDs

Most codes can be mapped within 2 levels of hierarchy!

Two Degrees of Separation

Congenital anomaly of cardiovascular system

0

Rotterdam

1 **Nashville**

NYC

Seattle **Taipei**

2

Congenital anomaly of cerebrovascular system

Congenital heart disease

Congenital anomaly of pulmonary artery

Concluding Remarks

- Many concepts can be mapped within **2 degrees of separation** within the concept hierarchy

- Must be careful that the **correct clinical meaning** is preserved before merging concepts

- Unfortunately this requires a lot of manual review due to inconsistencies in semantics within the hierarchy

Summary of Relevant Studies

- **MR Boland,** MS Kraus, E Dziuk, AR Gelzer. Investigating Cardiovascular Disease – Birth Month Associations in Canines: A Model Organism for Human Heart Disease. *Scientific Reports*; **2018;** 8:7130.
- **MR Boland,** P Parhi, R Miotto, R Carroll, U Iqbal, P-A Nguyen, M Schuemie, SC You, D Smith, S Mooney, P Ryan, Y-C Li, RW Park, J Denny, JT Dudley, G Hripcsak, P Gentine, NP Tatonetti. Uncovering Exposures Responsible for Birth Season – Disease Effects: A Global Study. *J Am Med Inform Assoc.* 2018; 25(3):275-288*.*
- **MR Boland,** P Parhi, P Gentine, NP Tatonetti. Climate Classification is an Important Factor in Assessing Quality-of-Care Across Hospitals. *Scientific Reports.* **2017**; 7:4948.
- L Li*, **MR Boland*,** R Miotto*, NP Tatonetti, J Dudley. Replicating Cardiovascular Condition-Birth Month Associations. Scientific Reports. **2016** ; 6: 33166. *Equal-Contribution
- **MR Boland**, Z Shahn, D Madigan, G Hripcsak, NP Tatonetti. Birth Month Affects Lifetime Disease Risk: A Phenome-Wide Method. J Am Med Inform Assoc. **2015**; 22(5):1042-53.

Dataset Acknowledgments

Co-Authors on This Work
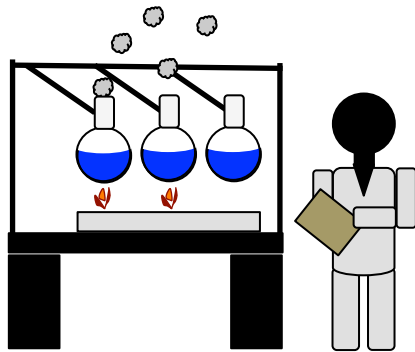
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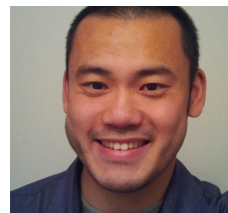Assistant Professor of Informatics

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5	8	57	60
B	**O**	**La**	**Nd**
10.811	15.999	138.91	144.21

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