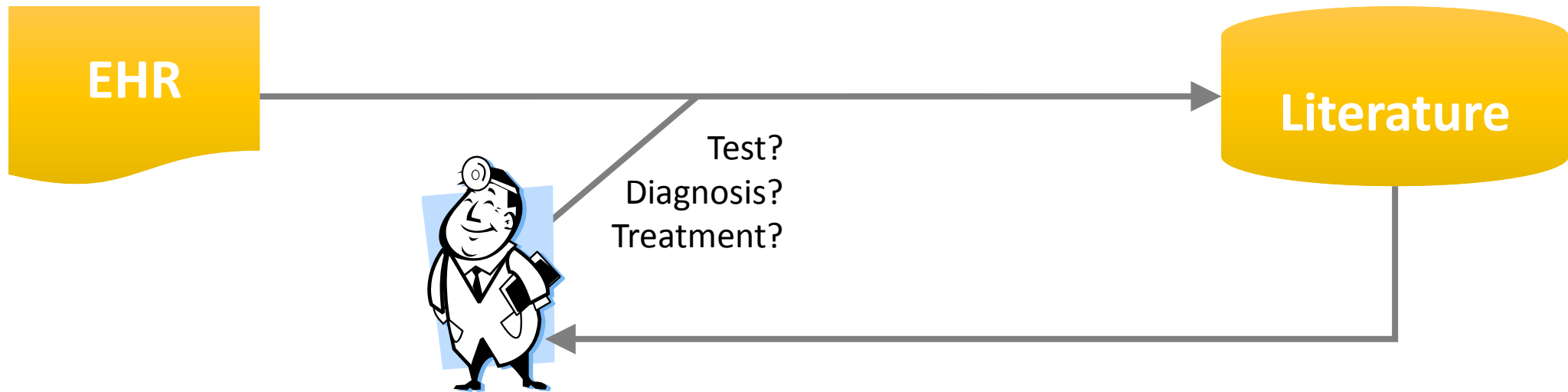


TREC 2015

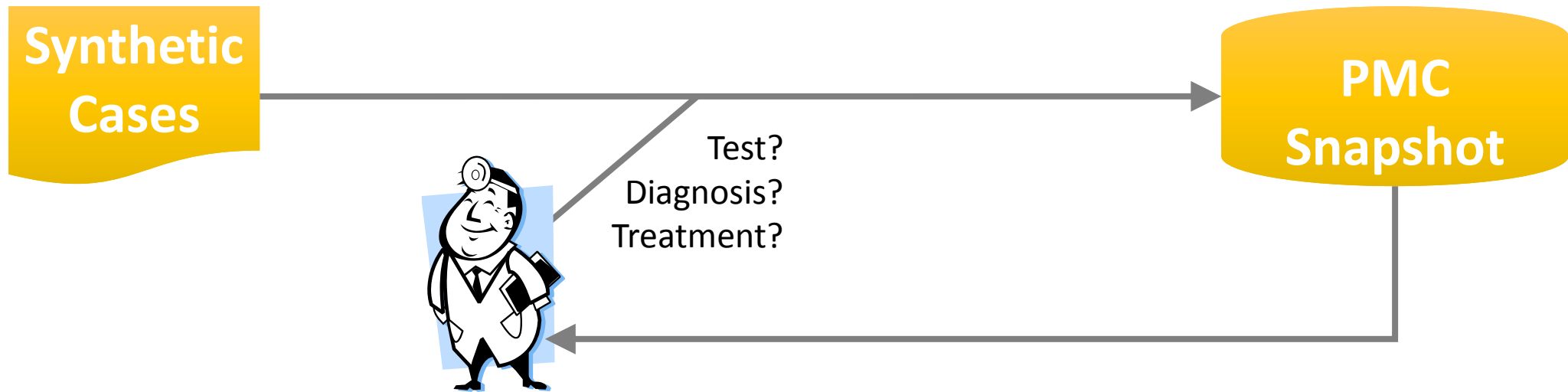
Clinical Decision Support

Kirk Roberts, NLM
Matthew S. Simpson, NLM
Ellen Voorhees, NIST
William R. Hersh, OHSU

TREC Clinical Decision Support



TREC Clinical Decision Support

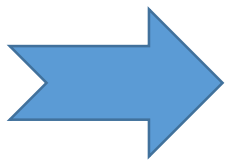


Topics

Diagnosis

A 44 yo male is brought to the emergency room after multiple bouts of vomiting that has a “coffee ground” appearance. His heart rate is 135 bpm and blood pressure is 70/40 mmHg. Physical exam findings include decreased mental status and cool extremities. He receives a rapid infusion of crystalloid solution followed by packed red blood cell transfusion and is admitted to the ICU for further care.

Summary: *A 44-year-old man with coffee-ground emesis, tachycardia, hypoxia, hypotension and cool, clammy extremities.*



**Hypovolemic Shock secondary to
Upper Gastrointestinal Bleed**

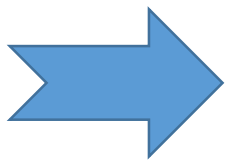
Topics

Test

A 56-year old Caucasian female complains of being markedly more sensitive to the cold than most people. She also gets tired easily, has decreased appetite, and has recently tried home remedies for her constipation. Physical examination reveals hyporeflexia with delayed relaxation of knee and ankle reflexes, and very dry skin. She moves and talks slowly.

Summary: *A 56-year old Caucasian female presents with sensitivity to cold, fatigue, and constipation. Physical examination reveals hyporeflexia with delayed relaxation of knee and ankle reflexes, and very dry skin.*

Diagnosis: *Hyperthyroidism*



Serum TSH level

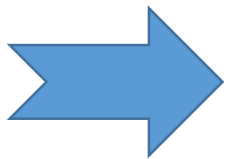
Topics

Treatment

A 32-year-old male presents to your office complaining of diarrhea, abdominal cramping and flatulence. Stools are greasy and foul-smelling. He also has loss of appetite and malaise. He recently returned home from a hiking trip in the mountains where he drank water from natural sources. An iodine-stained stool smear revealed ellipsoidal cysts with smooth, well-defined walls and 2+ nuclei.

Summary: *A 32-year-old male presents with diarrhea and foul-smelling stools. Stool smear reveals protozoan parasites.*

Diagnosis: *Giardiasis*



Metronidazole

Document Collection

- 733,138 full-text scientific articles from Open Access Subset of PubMed Central
 - National Library of Medicine's MEDLINE
- NXML-formatted

Evaluation

- **Task A**: Description or Summary (30 topics)
- **Task B**: Task A + **Diagnosis** for Topics 11-30
- Automatic or manual submissions
- 3 runs/task
- 3 relevance levels: Definitely Relevant, Partially Relevant, Not Relevant
- 4 scoring metrics: P@10, R-prec, inferred AP, **inferred NDCG**
- Each topic fully-assessed by a single physician

Evaluation

1. Topic description & summary
2. Article text
3. List of articles
4. Relevance Selection

The screenshot shows a web application interface for judging a topic. The browser address bar shows the URL: `skynet.ohsu.edu:7777/pools/judge_topic?pool_id=1&topic_id=1`. The user is logged in as Steven Bedrick. The main heading is "Judging topic 1 (Type: Diagnosis)".

Summary: 58-year-old woman with hypertension and obesity presents with exercise-related episodic chest pain radiating to the back.

Description: A 58-year-old African-American woman presents to the ER with episodic pressing/burning anterior chest pain that began two days earlier for the first time in her life. The pain started while she was walking, radiates to the back, and is accompanied by nausea, diaphoresis and mild dyspnea, but is not increased on inspiration. The latest episode of pain ended half an hour prior to her arrival. She is known to have hypertension and obesity. She denies smoking, diabetes, hypercholesterolemia, or a family history of heart disease. She currently takes no medications. Physical examination is normal. The EKG shows nonspecific changes.

Relevance Selection: A list of 13 articles is shown, each with a relevance selection button (Relevant, Partially Relevant, Not Relevant). The first article, "Starling on the heart. Facsimile reprints including the Linacre Lecture on the Law of the Heart", is highlighted with a red arrow labeled '4'. The other articles are numbered 2 through 13.

Article Text: The full text of the selected article is displayed in the center. It is titled "Starling on the heart. Facsimile reprints including the Linacre Lecture on the Law of the Heart" and is reviewed by Arthur Hollman. A red arrow labeled '2' points to the full text area.

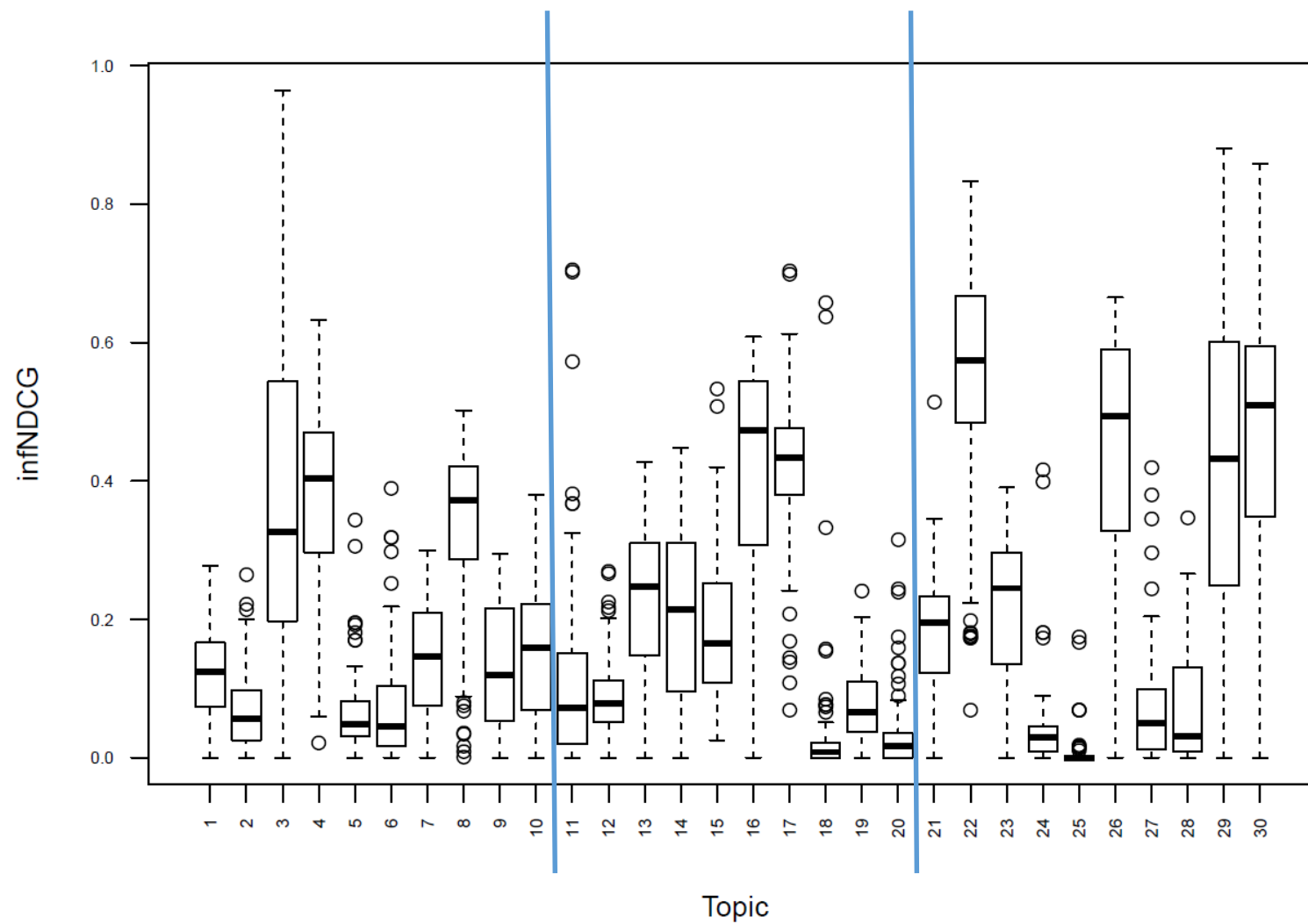
Recent Activity: A list of recent activity is shown on the right, including "A medieval glorification of disease and death", "Some lesser known Irish physicians", "Swift's half-way house", "Starling on the heart. Facsimile reprints including the Linacre Lecture on the L...", and "Downregulation of the anaphase-promoting complex (APC)7 in invasive ductal carci...". A red arrow labeled '3' points to the list of articles on the left.

Participation

- 36 teams
- 178 runs

Team ID	Affiliation	# Runs			
		Task A		Task B	
A	M	A	M		
CBIA_VT	Center for Business Intelligence and Analytics, Virginia Tech	3	0	3	0
cbnu	Chonbuk National University	3	0	3	0
CL_CAMB	Computer Laboratory, University of Cambridge	3	0	3	0
DA_IICT	Dhirubhai Ambani Institute of Informantion & Communication Technology	2	0	0	0
DBNET_AUEB	Athens University of Economics and Business	2	0	2	0
DUTH	Democritus University of Thrace	2	1	3	0
ECNU	East China Normal University	3	0	3	0
EMSE	Mines Saint-Etienne	3	0	0	0
EPBRN	University of New South Wales, Australia	3	0	0	0
FDUDMIIP	School of Computer Science, Fudan University	2	1	1	2
Foreseer	University of Michigan	1	2	1	2
FORTH_ICS_ISL	Foundation for Research and Technology, Institute of Computer Science	3	0	3	0
GRIUM	GRIUM	2	0	0	0
Hipocrates15	California State University San Marcos	2	1	0	0
HITSJ	Language Technology Research Center of Harbin Institute of Technology	2	1	2	1
hltcoe	JHU Human Language Technology Center of Excellence	3	0	3	0
KISTI	Korea Institute of Science and Technology Information	3	0	3	0
LAMDA	Ajou University	3	0	3	0
LIMSI	Labo d'Informatique pour la Mecanique et les Sciences de l'Ingenieur	3	0	3	0
LIST_LUX	Luxembourg Institute of Science and Technology	3	0	1	0
NOVASEARCH	Universidade Nova de Lisboa	3	0	3	0
NU_UU_UNC	Northwestern University, University of Utah and UNC	1	2	2	1
OHSU	Oregon Health & Science University	1	2	1	2
PKUICST	Peking University	3	0	0	0
prna	Philips Research North America	3	0	3	0
SCIAITeam	Siena College Institute for Artificial Intelligence	3	0	0	2
SIBtex	SIBtex / BiTeM	3	0	0	0
SIBtex2	SIBtex / BiTeM	3	0	0	0
SNUMedinfo	Seoul National University	3	0	3	0
Sortinghat	International Institute of Information Technology Bangalore	1	0	1	0
TUW	Vienna University of Technology	3	0	3	0
udel	University of Delaware	3	0	3	0
UTDHLTRI	The University of Texas at Dallas	3	0	3	0
UWMLUO	University of Wisconsin-Milwaukee	3	0	2	1
WaterlooClarke	University of Waterloo	3	0	0	0
wsu_ir	Wayne State University	2	1	1	2
total		92	11	62	13

Results – Task A



Results – Task A – Manual

All Runs (infNDCG)		Best Run (infNDCG)	
#	11	#	8
Best	0.3109	Best	0.3109
Median	0.2689	Median	0.2504
Mean	0.2506	Mean	0.2496

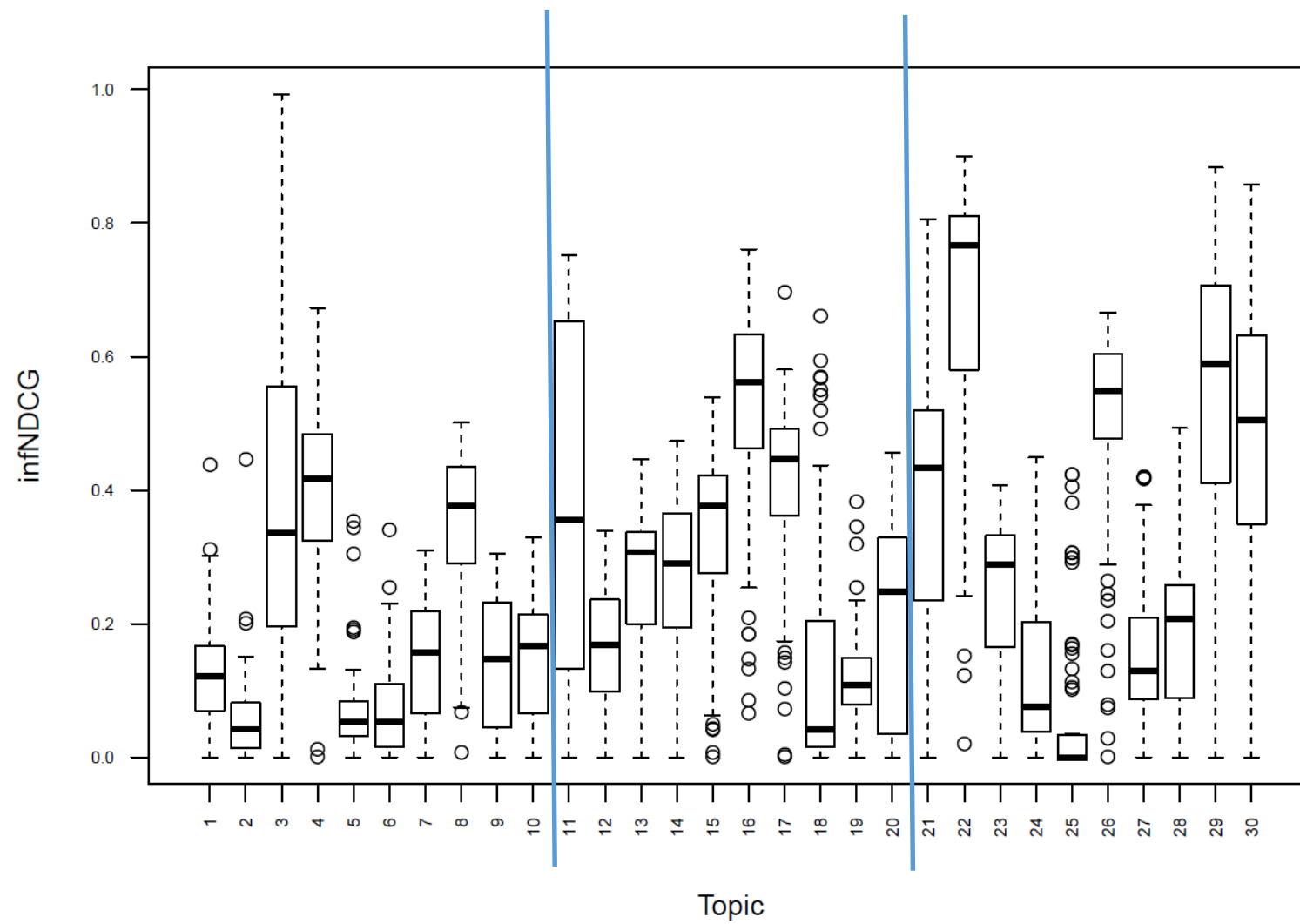
Wayne State Univ.	0.3109	description
Northwest./Utah/UNC	0.3019	summary
Univ. of Michigan	0.2954	summary
Fudan Univ.	0.2689	description
Demo. Univ. of Thrace	0.2318	summary

Results – Task A – Automatic

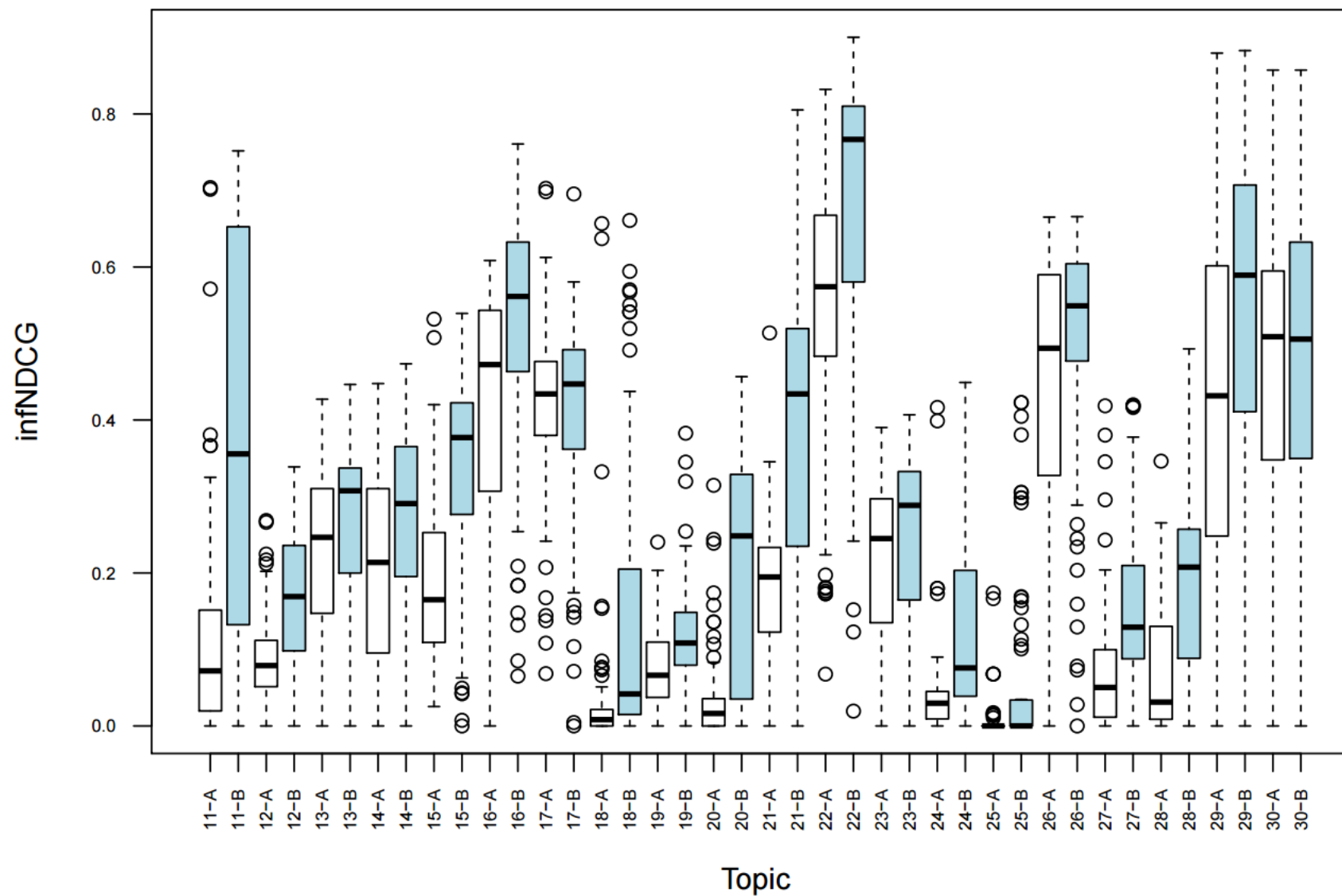
All Runs (infNDCG)		Best Run (infNDCG)	
#	92	#	36
Best	0.2939	Best	0.2939
Median	0.2120	Median	0.2288
Mean	0.1973	Mean	0.2099

Wayne State Univ.	0.2939	description
Luxembourg IST	0.2894	summary
Univ. of Cambridge	0.2823	summary
East China Normal U.	0.2680	summary
Univ. of Delaware	0.2676	summary

Results – Task B



Results – Task A vs. Task B



Results – Task B – Manual

All Runs (infNDCG)		Best Run (infNDCG)	
#	13	#	8
Best	0.3809	Best	0.3809
Median	0.3208	Median	0.3212
Mean	0.2717	Mean	0.2842

Fudan Univ.	0.3809	description
Wayne State Univ.	0.3690	description
Univ. of Michigan	0.3535	summary
Northwest./Utah/UNC	0.3255	summary
Harbin Inst. of Tech.	0.3168	summary

Results – Task B – Automatic

All Runs (infNDCG)		Best Run (infNDCG)	
#	62	#	26
Best	0.3821	Best	0.3821
Median	0.2920	Median	0.3095
Mean	0.2683	Mean	0.2870

East China Normal U.	0.3821	summary
Vienna Univ. of Tech.	0.3616	summary
Seoul Nat'l Univ.	0.3611	description
LIMSI	0.3507	summary
Univ. of Cambridge	0.3471	summary

Acknowledgements

- Topic Creators: Dina Demner-Fushman, Swapna Abhyankar, Fabricio Kury, Laritza Rodriguez, Bryan Hendrickson, Raymonde Uy
- Assessors: OHSU medical informatics grad students
- Support: NIST + NLM