ASSESSING USE OF AN ELECTRONIC DIFFERENTIAL DIAGNOSIS GENERATOR BY EMERGENCY MEDICINE PROVIDERS

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AAEM Presentation

Beaumont

Background

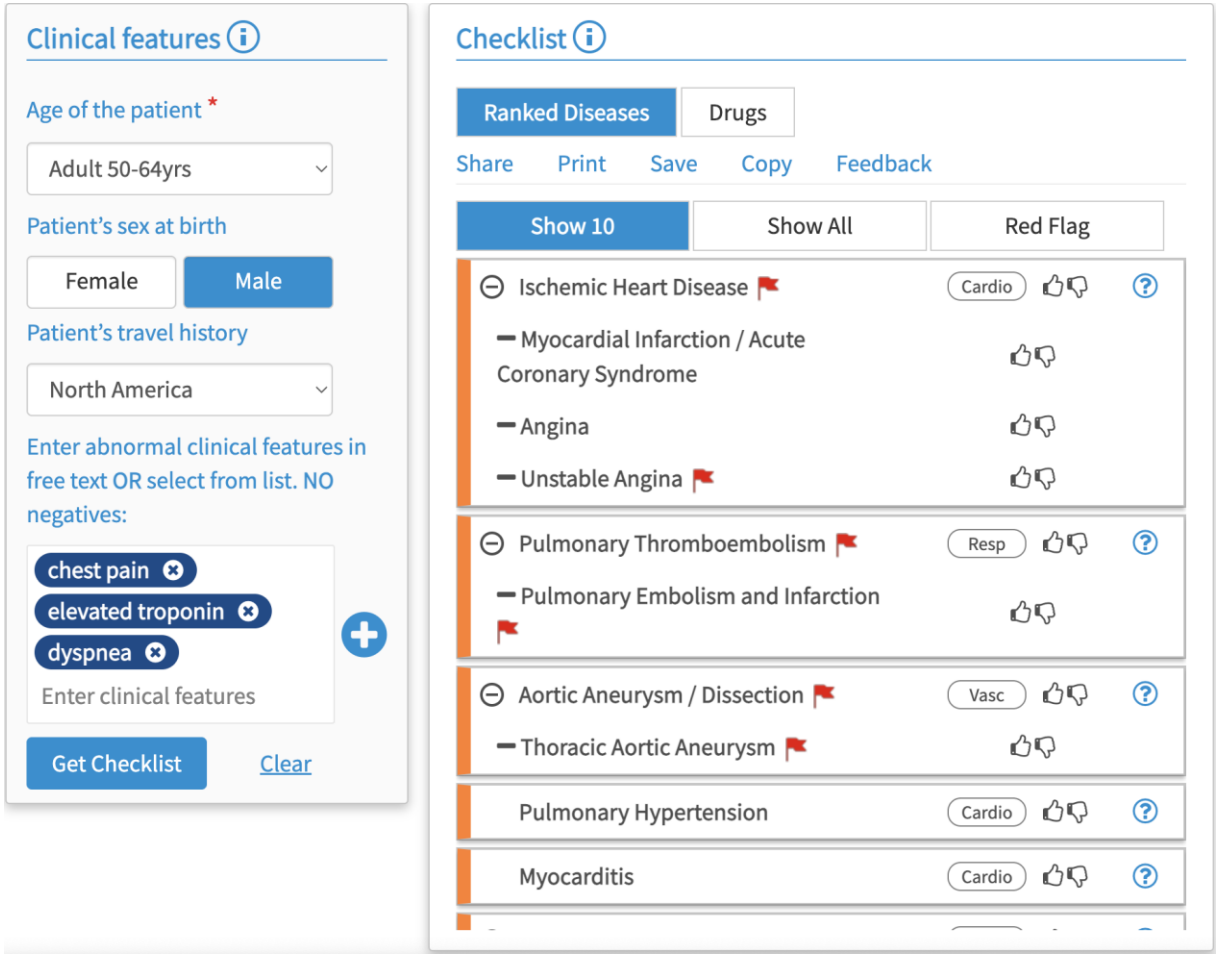
- Institute for Healthcare Improvement recognized diagnostic error as critical area of focus for improving healthcare outcomes[1]
- Misdiagnosis associated with adverse events/deaths and increased cost of healthcare[1,2]
- Emergency Department (ED) especially prone to diagnostic error[3]
- Differential diagnosis tools shown to be accurate, but clinical utility not yet demonstrated

[1]Balogh EP, Miller BT, Ball JR. Improving diagnosis in health care. 2016.

[2] Smith, M et al. Best Care at Lower Cost. 2013.

[3] Croskerry P, Sinclair D. Emergency medicine: A practice prone to error? 2001.

Background


Clinical features
Age of the patient *
Adult 50-64yrs
Patient's sex at birth
Female
Male
Patient's travel history
North America
Enter abnormal clinical features in free text OR select from list. NO negatives:
chest pain
elevated troponin
dyspnea
Enter clinical features
Get Checklist
Clear
Checklist
Ranked Diseases
Drugs
Share
Print
Save
Copy
Feedback
Show 10
Show All
Red Flag
Ischemic Heart Disease
Cardio
Myocardial Infarction / Acute Coronary Syndrome
Angina
Unstable Angina
Pulmonary Thromboembolism
Resp
Pulmonary Embolism and Infarction
Aortic Aneurysm / Dissection
Vasc
Thoracic Aortic Aneurysm
Pulmonary Hypertension
Cardio
Myocarditis
Cardio

Methods

- Differential diagnosis tool, Isabel, installed on Beaumont ED computers
- Retrospective usage data
  - Patient data elements
  - Average number of queries per patient
  - Assessment of diagnoses via common ED textbooks [4,5]
- Survey
  - Frequency of use
  - Obstacles to use
  - Utility in improving diagnosis and patient safety

[4]Tintinalli, JE et al. Tintinalli's Emergency Medicine: A Comprehensive Study Guide. 2020.
[5]Walls RM, Hockberger RS. Rosen's Emergency Medicine: Concepts and Clinical Practice. 2018.

Results – Retrospective Data

- 224 queries
  - 107 unique patients
  - 78.5% adult
- Average of 4.1 (SD 1.07) data elements per query
  - 34.6% included lab data
- 8.4% of searches generated uncommon diagnosis
  - 66% dermatologic

Results

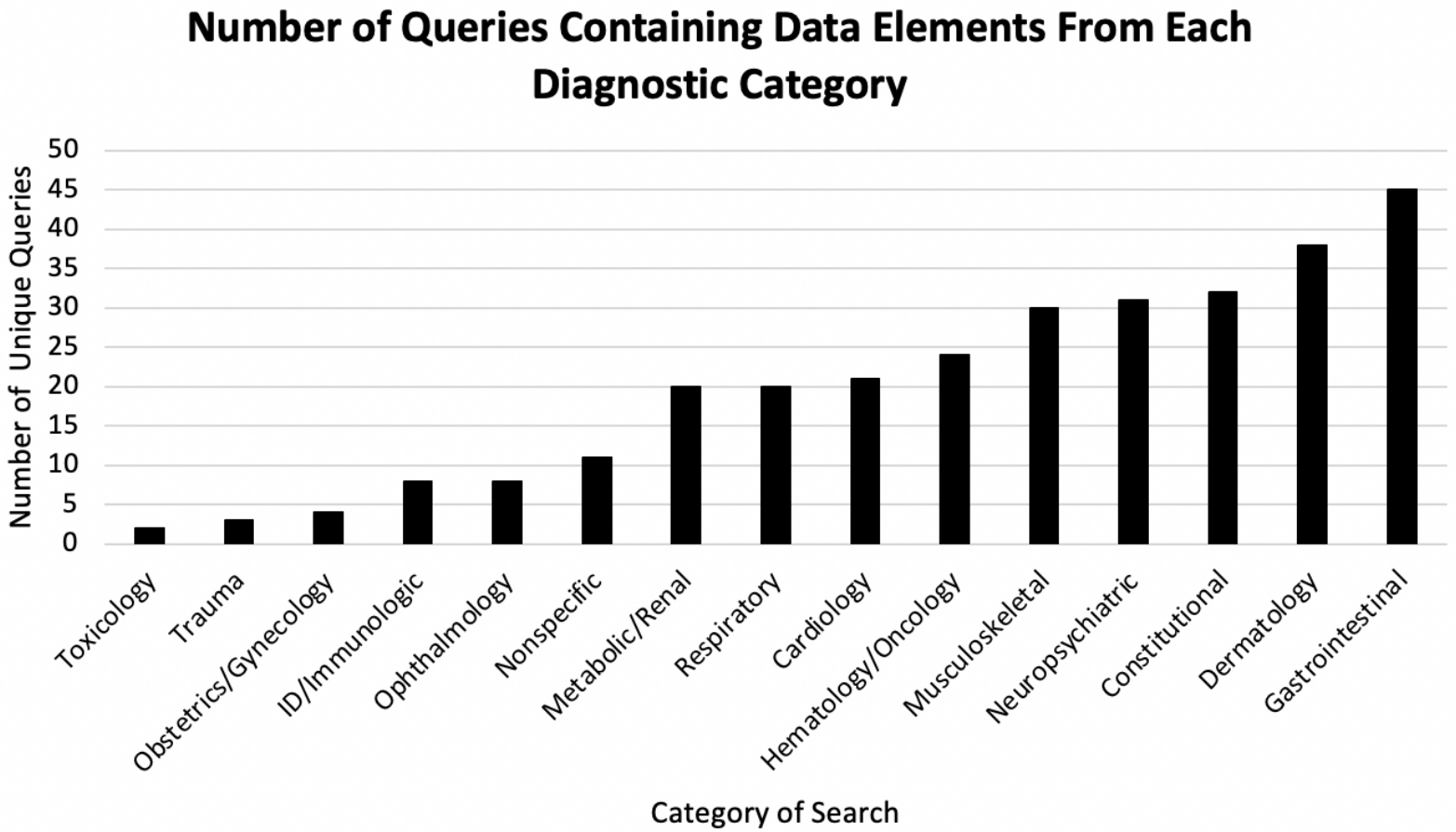


Figure 1. Number of queries containing data elements from each diagnostic category. The most commonly queried data elements involved dermatologic, gastrointestinal, and constitutional complaints. Toxicology and trauma complaints were less common.

Results - Survey

- Survey sent to 120 ED clinicians
- 32 responses
  - 7 reported using tool
- 6/7 rated the tool as good or very good for generating a DDx
- 4/7 reported using the tool to make a potentially life-threatening diagnosis
- Common reasons for not using the tool
  - Forgetting tool was available
  - Not feeling need to use tool
  - Disruption to workflow

Discussion

- DDx tool was used mostly for constitutional, dermatologic, gastroenterological diagnoses
- Potential for DDx tool as cognitive forcing tool
- Hesitance to use the tool due to high diagnostic confidence and workflow disruption[6]

[6]Meyer AND, et al. Physicians' diagnostic accuracy, confidence, and resource requests: A vignette study. 2013.

Conclusion

- Electronic differential diagnosis tools have the potential to assist ED clinicians in identifying rare diagnoses, however clinician adoption of the tool and integration of the tool into the provider's workflow are potential barriers to utility in the ED setting.

Current State of Project

- Submitted for publication as of April 2022

References

[1] Balogh EP, Miller BT, Ball JR. Improving diagnosis in health care. 2016. https://doi.org/10.17226/21794.

[2] Smith, Mark; Saunders, Robert; Stuckhardt, Leigh; McGinnis JM. Best Care at Lower Cost. 2013. https://doi.org/10.17226/13444.

[3] Croskerry P, Sinclair D. Emergency medicine : A practice prone to error ? Canadian Journal of Medicine. October 2001;3:271–6.

[4] Tintinalli, Judith E; Ma, O John; Yealy, Donald M.; Meckler, Garth D.; Stapczynski, J. Stephan; Cline, David M.; Thomas SH. Tintinalli's Emergency Medicine: A Comprehensive Study Guide. 9th ed. McGraw Hill; 2020.

[5] Walls RM, Hockberger RS G-HM. Rosen's Emergency Medicine: Concepts and Clinical Practice. 9th ed. Philadelphia, PA: Elselvier - Health Sciences; 2018.

[6] Meyer AND, Payne VL, Meeks DW, Rao R, Singh H. Physicians' diagnostic accuracy, confidence, and resource requests: A vignette study. JAMA Intern Med 2013;173:1952–61. https://doi.org/10.1001/jamainternmed.2013.10081.