Exploring the role of

DECISION SUPPORT SYSTEMS

For differential diagnosis in out of hours and primary care in Scotland

Dr Mark Cooper[1], Professor Bridget Johnston[2](corresponding), Chris McParland[3] (presenting), and Annabel Farnood[4]*

[1]Consultant Nurse for Advanced Practice at NHS Greater Glasgow and Clyde, and Honorary Senior Clinical Lecturer, University of Glasgow School of Medicine, Dentistry and Nursing; [2]Florence Nightingale Foundation Clinical Professor of Nursing, University of Glasgow, School of Medicine, Dentistry and Nursing, and NHS Greater Glasgow and Clyde; [3]Research Assistant, University of Glasgow School of Medicine, Dentistry and Nursing; [4]PhD Nursing Student, University of Glasgow, School of Medicine, Dentistry and Nursing.

* @BridgetJohnst or bridget.johnston@glasgow.ac.uk

Differential diagnosis decision support systems (DDDSS) are computer-based systems designed to support clinicians or members of the public to make decisions about differential diagnoses. The user enters clinical findings and the system generates a differential diagnosis. For members of the public, these systems are commonly referred to as symptom checkers. In 2018, a team at the University of Glasgow undertook a study for the Scottish Government to explore the potential role of these systems in out of hours and primary care in Scotland

Aims:

This project aimed to identify the needs of out of hours and primary care clinicians and the public with regard to DDDSS, and to assess the strengths and weaknesses of commercially available systems

Methods

Rapid Review

A rapid review of the published literature was conducted. MEDLINE, Embase and CINAHL were searched between 1990 and March 2018. Single author (AF) screening against eligibility criteria, with a second author (CM) assisting with full-text screening resulted in 15 eligible articles. Data were extracted and subject to thematic analysis (1).

Market Research

Commercially available DDDSS were identified through online searches, industry contacts and the professional literature. To qualify as a DDDSS, it was agreed that a system must be capable of generating a dynamic differential diagnosis based on entered clinical findings. Companies who produced a DDDSS were contacted and provided with a questionnaire designed to gather information on their systems. Some systems were also trialled.

Focus Groups

Qualitative focus groups were conducted with clinicians and the public to explore their needs in relation to DDDSS. Focus groups were audio-recorded, transcribed verbatim and subject to a thematic analysis (1). 13 advanced nurse practitioners, 7 GPs, 2 AHP advanced practitioners and 7 members of the public took part (*n*=29).

Results

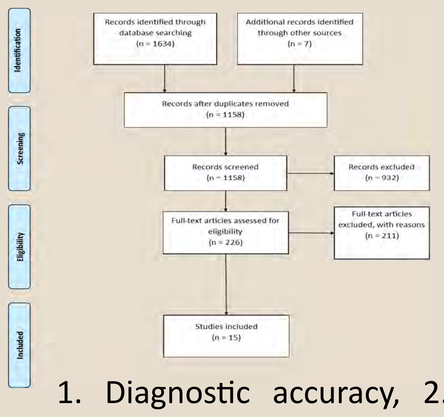

Figure 1: PRISMA Flow Diagram

Six themes were identified by the thematic analysis: 1. Diagnostic accuracy, 2. Speed and time efficiency, 3. User feedback, 4. Use in education 5. use in primary care and 6. Costs. The majority of studies were on *Isabel.*

Eleven companies were contacted, six of whom returned information. Three of these companies produced a system which met our definition of a DDDSS (*DXplain, Isabel* and *VisualDx*). A fourth DDDSS was identified (*PEPID*), but the company did not respond. Novel features such as natural language processing (*Isabel*), offline access (*PEPID*), vast image libraries (*VisualDx*) and tailored questions to refine the differential (*DXplain*) distinguish these tools from one another

Four themes were identified through the thematic analysis: 1. current practice, 2. attitudes to DDDSS, 3. implementation considerations, and 4. desirable characteristics of DDDSS. These findings are reported elsewhere at this conference and in an open access article (2).

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Conclusions:

There are only a small number of DDDSS available, each with their own strengths and weaknesses. **The majority of the available research is on one system** (*Isabel*), and only a small number of studies were undertaken in a clinical setting. More research is needed into how other systems perform, and how systems are applied in clinical practice. **Clinicians want a system that is easy, fast, reliable, accurate, and links to trusted evidence.** Of particular interest to nurses would be **the potential for this technology to support new and trainee advanced nurse practitioners** in out of hours and primary care.

1. Braun V, Clarke V. Using thematic analysis in psychology. Qualitative Research in Psychology. 2006;3(2):77-101.
2. McParland CR, Cooper MA, Johnston B. Differential Diagnosis Decision Support Systems in Primary and Out-of-Hours Care: A Qualitative Analysis of the Needs of Key Stakeholders in Scotland. Journal of Primary Care & Community Health. 2019;10:2150132719829315.

Visit the websites of the included DDDSS for more information:

DXplain: www.mghlcs.org/projects/dxplain **PEPID:** www.pepid.com
Isabel: www.isabelhealthcare.com **VisualDx:** www.visualdx.com