

Decision support in primary and secondary outpatient care

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HEALCLOUD

Introduction

Application of medical decision support promotes quality of medical care through enhancing prevention, diagnosis, therapy and patient safety and therefore such IT developments serve higher societal needs

Practising physicians in primary care (family medicine) and outpatient secondary care (private practitioner specialists and polyclinics) are in the need for IT-enabled medical decision support during their daily activities and clinical research curriculum to leverage their skills and their 'rapport' aimed at building and maintaining an optimal patient-doctor relationship

Especially GPs constitute to some extent a neglected medic subpopulation regarding such IT support

Healcloud #1

Next-generation medical practice management system for general and private practitioners offering

device-independent zero-installation policy

mobile usage










state-of-the-art UX, ergonomic UI

industry-standard data security

Free for medical users: Most probably the single one free EHR system available to include medical logic / decision support !

Healcloud #2

The screenshot shows a web browser window with the URL <https://staging.healcloud.com/#/dashboard/patients>. The page header includes the Healcloud logo, the name "HEALCLOUD", and the user profile "Dr. Ethan Steele | MedW1". A sidebar on the left contains navigation icons for PATIENTS, MESSAGES, SCHEDULE, MY DRAFTS, LIBRARY, REPORTS, SICK LEAVE, QUERIES, SUPPORT, HELP, SETTINGS, and SIGN OUT. The main content area features a search bar and a table of patients.

Name	Insurance ID	DOB	Contact Info	Accessed
 János Kís		Male	No available phone number.	Feb 17, 2017 10:43:40 PM
 Cohen David	123456797	Mar 10, 1972 Male	Austria, 1010 Vienna Opernring 18 2/3 +43 987 654 3219	Mar 13, 2017 2:40:58 PM
 Lyons Gabriel	123456791	Sep 2, 1976 Male	Austria, 1010 Vienna Opernring 13 4/1 +43 987 654 3213	Jan 20, 2017 11:24:20 AM
 Burgess Lucas	123456789	Nov 2, 1974 Male	Austria, 1010 Vienna Opernring 11 2/3 +43 987 654 3211	Jan 20, 2017 11:25:01 AM
 Kovács Miklós	123456795	May 3, 1974 Male	Hungary, 1111 Budapest Szent Gellert ter 1 4/1 +36 987 654 3221	Feb 6, 2017 9:47:41 PM
 Aiden Richard	123456799	Jan 12, 1972 Male	Austria, 1010 Vienna Opernring 16 4/1 +43 987 654 3217	Jan 20, 2017 11:25:52 AM
 Horváth Ádám	123456793	Jul 6, 1964 Male	Hungary, 1111 Budapest Szent Gellert ter 2 2/3 +36 987 654 3215	Jan 20, 2017 11:26:17 AM
 Bauer Chloe	123456790	Oct 2, 1980 Female	Austria, 1010 Vienna Opernring 12 3/2 +43 987 654 3212	Jan 20, 2017 11:28:17 AM
 Barrett Emma	123456798	Feb 11, 1972 Female	Austria, 1010 Vienna Opernring 19 3/2 +43 987 654 3220	Jan 20, 2017 11:27:18 AM

At the bottom of the table, there is a pagination control with buttons for "First", "Previous", "1", "2", "Next", and "Last". The "1" button is highlighted, indicating the current page. In the bottom right corner, there is a small text block: "core: bae24fa-1493391985" and "web: adf178a-1493391924".

Healcloud #3

Healcloud

Secure https://staging.healcloud.com/#/dashboard/patient/5881d8df0c60db0006649f2d/summary

HEALCLOUD

Dr. Ethan Steele | MedW1

Mr. Burgess Lucas
1974-11-02 (42)
123456789

+ Add photo

Known allergies

Diseases
N2510 Nephrogen diabetes insipidus

Summary Personal Results History Drafts Documents Nursing activities New encounter

ALERTS
Patient has no alerts

Main area for medical decision support messages / informations

DIAGNOSIS
Latest diagnoses

Allergies
No allergies

RISK FACTORS
Previous medications

Past treatments
Herniated disk (Apr 13)

FAMILY HISTORY
Prostate cancer in paternal line

NOTES
Test patient. Not actual data. For illustrative purposes only.

Healcloud #4

The screenshot shows a web browser window with the URL `https://staging.healcloud.com/#/dashboard/patient/5881d8df0c60db0006649f2d/encounter/590dfecedf3b5000054b66a6/...`. The page header includes the Healcloud logo, the name "HEALCLOUD", and the user "Dr Ethan Steele | MedW1".

The left sidebar contains navigation icons for PATIENTS, MESSAGES, SCHEDULE, MY DRAFTS, LIBRARY, REPORTS, SICK LEAVE, QUERIES, SUPPORT, HELP, SETTINGS, and SIGN OUT.

The main content area is for patient "Mr. Burgess Lucas" (DOB: 1974-11-02, ID: 123456789). It features a "New encounter" button and tabs for Summary, Personal, Results, History, Drafts, Documents, and Nursing activities. The "Summary" tab is active, showing "VISIT DATA 18:50 PM 05/06/2017".

Key information includes:

- Supply: Doctor's office
- Type of supply: Treatment without sick leave
- Diary nr: 20170506001
- Payment category: Hungarian national insurance
- Date: May 6, 2017
- EU data sheet: Not filled!

Below this is a row of tabs: Examination, Referral, Prescription, Sick leave, Ambulant voucher, and Other. The "Examination" tab is selected.

The examination form includes:

- Complaints:
- Status:
- Diagnosis:
- Therapy:
- Notes:

On the right side of the form, there are input fields for:

- Left-arm blood pressure: / Hgmm
- Right-arm blood pressure: / Hgmm
- Pulse: /min
- Height: cm
- Weight: kg
- Waist size: cm

Below the form is a "SCREENINGS" section with a "+ Add screening" button and a search input field. A "VACCINATIONS" section is also visible at the bottom.

Diagnostic Decision Support Tools (DDSTs) #1

DDSTs are Healcloud's proprietary implementation of *medical decision support*

DDSTs pertain to selected "high value" therapeutic areas (TAs)

Aim of DDSTs

- to help the physician forming an initial diagnosis, including risk assessment / stratification

- to support the caring physician - thus promoting safety and efficacy of patient care - by

 - planning follow-up visit schedule and

 - tracking treatment success attaining therapeutic target outcomes

Diagnostic Decision Support Tools (DDSTs) #2

Development of DDSTs occurs on two echelons:

Medical

Technical

Definition - Medical echelon:

Explain core medical concepts related to the respective TA

Feature cumulative knowledge from international guidelines

The information contained therein can be used by the Healcloud physician user community, either as a reading exercise of the complete document and/or as a context-sensitive / field-level pop-up help

Diagnostic Decision Support Tools (DDSTs) #3

Implementation - Technical echelon:

Translate the medical-professional text into an IT solution

Framework: Model-View-Controller

Model = Hierarchical, adaptive (dynamic) database

View = Featuring entities from the database as input sheets

Controller = Algorithms for patient / procedure flow:
medical logic (automated actions, alerts, etc.)

Combination of programming tools

Traditional: e.g. MongoDB, JavaScript, HTML5/CSS

AI: Medexer ArdenSuite

Diagnostic Decision Support Tools (DDSTs) #4

The operation of DDSTs is based on

Value metrics, extracted from HealCloud databases captured by the doctor as input parameters, via screen forms (input sheets) and / or contained within core databases, e.g. in national drug formularies

Medical logic

to stratify patients according to selected criteria (e.g. risk stratification, patient selection for clinical research)

processes for follow-up visit planning, tracking trend of treatment indicators, etc.

Rationale for selection of TAs

BioPharma **industry** indicators

Medicines in development

pipeline patterns

number of drug candidates

Sales figures

Competence of the caring **physician** in the given TA

(N.B. primary care, outpatient secondary care)

Patient **population** considerations

Epidemiology

Availability and accessibility of patients in primary or private
secondary care (specialist outpatient) segments

High-impact TAs

Diabetology

Cardio- and cerebrovascular medicine

Hypertension

Myocardial infarction

Stroke

Lipidology

Respiratory system

Chronic obstructive pulmonary diseases (COPD)

Asthma bronchiale

Algiatry: Pain management (oncological + non-oncological)

Autoimmune diseases

Rheumatoid arthritis (RA)

Inflammatory bowel disease (IBD): Crohn's disease + Colitis ulcerosa

The DTOC(Q) paradigm

Healcloud, enabled by DDSTs, allows evaluation of clinical care along the following domains:

Diagnosis

Therapy

Outcome

Cost

(Quality: Policy compliance)

HEALCLOUD

A light blue stylized cloud logo consisting of two rounded, overlapping shapes. The left shape is larger and has a white arch cutout at the top. The right shape is smaller and also has a white arch cutout at the top. The overall appearance is that of a soft, billowy cloud.

**Thank you very much
for your kind attention!**

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