NCD SYMPOSIUM

Clinical Decision-Support Systems

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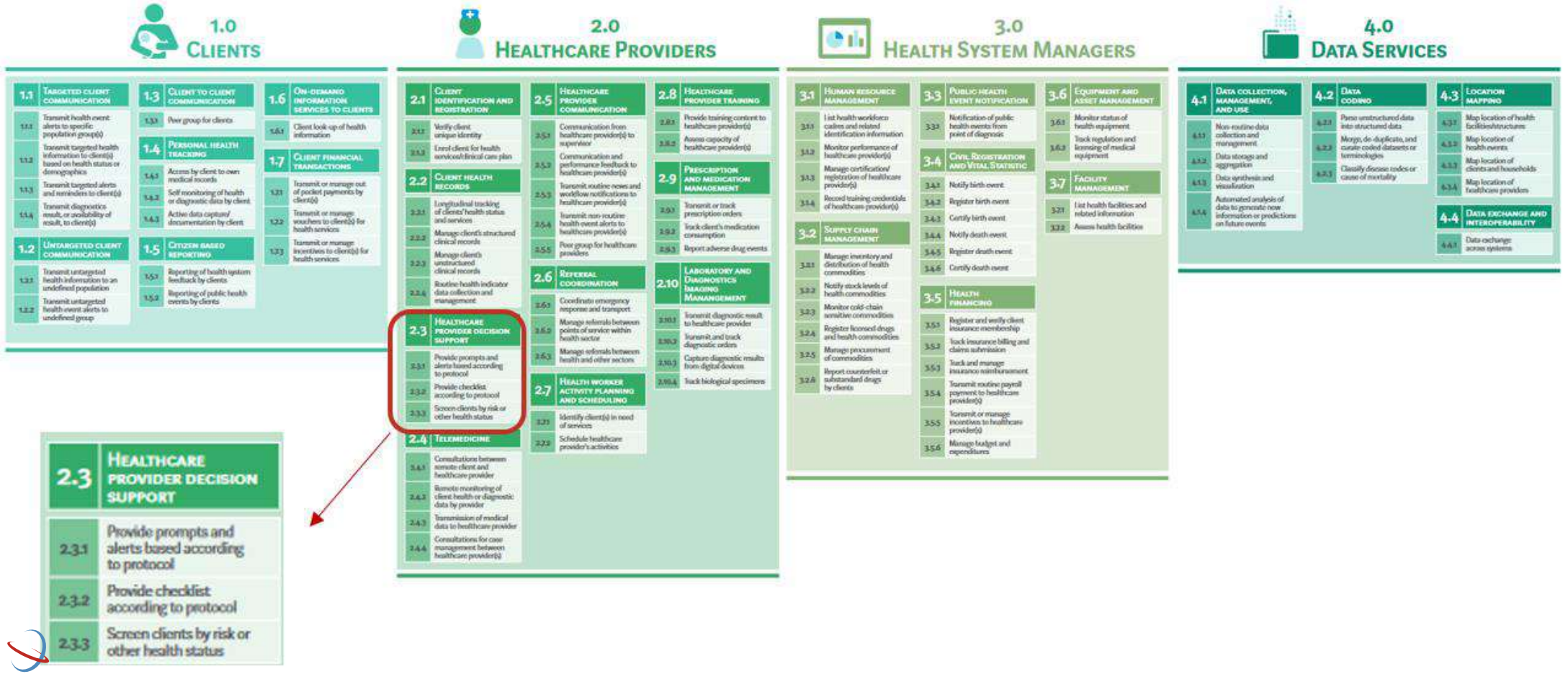
Swiss TPH

2023

Digital Health interventions for Health Systems Strengthening



What is a Clinical Decision-Support System (CDSS)?

‘**digitized job aids** that combine an **individual’s health information** with the **health worker’s knowledge** and **clinical protocols** to **assist** health workers in making **diagnosis and treatment decisions**’

WHO 2019

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What is a clinical decision-support system?

'**digitized job aids** that combine an **individual's health information** with the **health worker's knowledge** and **clinical protocols** to **assist** health workers in making **diagnosis and treatment decisions**'

WHO 2019

"any **on-screen tool** designed to **improve adherence** of physicians to a recommended **process of care**"

Kwan et al 2020

[the process that] "provides **clinicians, staff**, **patients**, or other individuals with **knowledge** and **person-specific information**, **intelligently filtered** or presented at **appropriate times**, to **enhance health and health care**"

Osheroff et al 2007

CDS do not simply assist with the retrieval of relevant information; they **communicate information** that takes into consideration the **particular clinical context**, offering **situation-specific information** and **recommendations**.

Musen et al 2021

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What does a CDSS look like?

Infobuttons – targeted links to relevant information, articles, guidance

Alerts e.g. penicillin allergy, need to assess vaccination status, suggesting a generic alternative for a drug

Order sets – e.g. pre-selected list of investigations for patient with specific disease / syndrome

Calculations of risk score, drug dosage…

Organisation / display of patient information e.g. dashboards / reports

Diagnostic and treatment support

Bronchial asthma

Asthma is a chronic inflammatory condition with reversible airway obstruction. Symptoms usually start after 2 years of age but may present earlier.

Diagnostic criteria

- Paroxysmal respiratory distress
- Recurrent cough
- Wheeze
- Chest tightness
- Forced expiratory volume 1 of less than 80%
- Good response to treatment with a bronchodilator

Investigation

- FPB
- ABG analysis
- Chest X-ray: often normal, therefore not routinely required
- Spirometry

Treatment

Nonpharmacological

- Give oxygen 2–4 L/min.

Pharmacological

- Severe asthma
- Admit to hospital:
  - Give nebulized salbutamol 5 mg (i.e., 0.5 mL of the 5 mg/mL nebulizer solution) PLUS budesonide 0.25 mg once daily.
  - Repeat intermittently every 4–6 hours until the child is stable.
  - Step down to metered dose inhalation for stable children.
  - Introduce two puffs (200 mcg) into the spacer chamber every 6–8 hours

For persistent asthma, give salmeterol 50 mg every 12 hours and fluticasone metered dose inhalation: 50 mcg/puff, 125 mcg/puff, 250 mcg/puff, starting dose 50–250 mg every 12 hours can be used.

Note:
- Mild asthma: Use salbutamol metered dose inhalation 400 mg as needed.
- Intermittent asthma: Use salbutamol/budesonide every 12 hours.
- Chronic persistent asthma: Use salmeterol/fluticasone every 12 hours.

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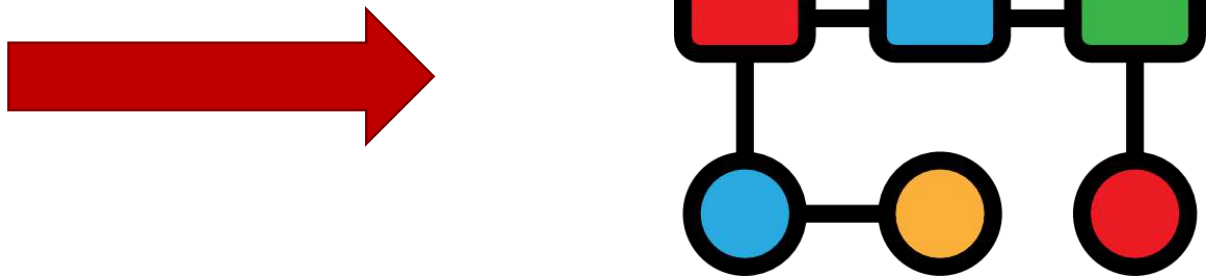
Combine:

- Knowledge base
- Individual health information

  Using decision-logic



Diagnostic and treatment support

Clinical guidelines
Consistent

Patient information
Changing

Consultation support

Diagnostic & therapeutic decision support

Epidemiological data collection for Health Management

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The tool guides the healthcare provider through the encounter

Suggests what is relevant for this specific patient:

- **Examinations and diagnostic tests**
- Diagnosis / risk scores
- Treatment
  - including dose calculation
- Referral
- Explanations & follow-up advice

Symptoms

Signs

Lab tests

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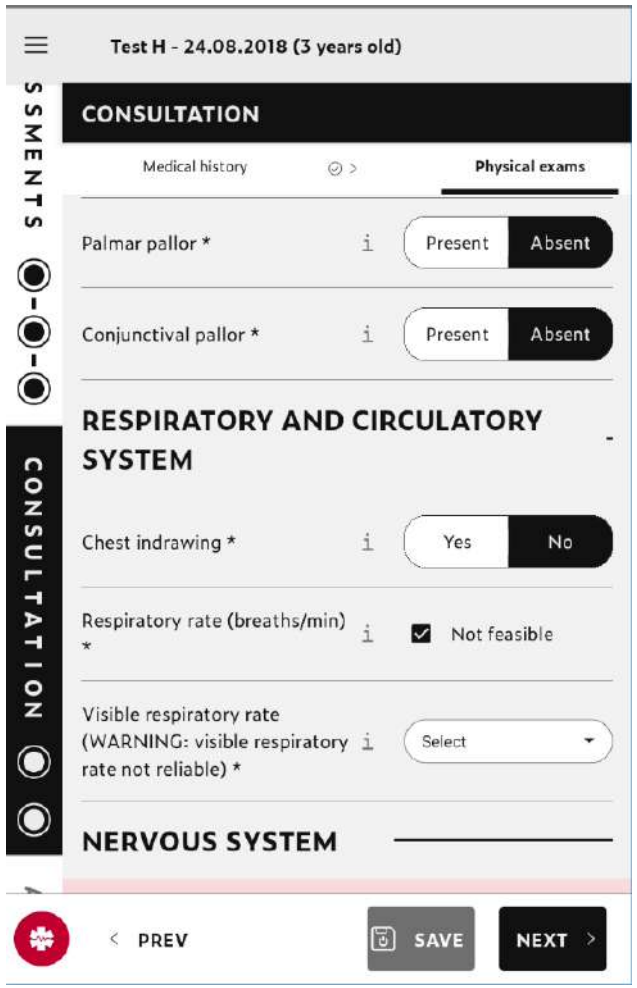
Additional supportive features can be built in



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Drug dosage calculation – example

Treatment

» Antibiotic Pre-referral treatment

***Is it possible to give Ceftriaxone (IM)?**

- (●) Yes
- ( ) No

Give first dose of **Ceftriaxone (IM)**: (80-100mg/kg/dose, single dose per day)

Powder vial of 1 g (1000mg): mix the powder (1g) with 3.5ml of sterile water for injection, to obtain a solution containing 250mg Ceftriaxone per 1ml (or 1g per 4ml)

For this child, give one dose of **3.0 ml** [250mg/ml] of Ceftriaxone IM

Patient:
female
age: 1 year
weight: 9kg

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Many shapes and sizes

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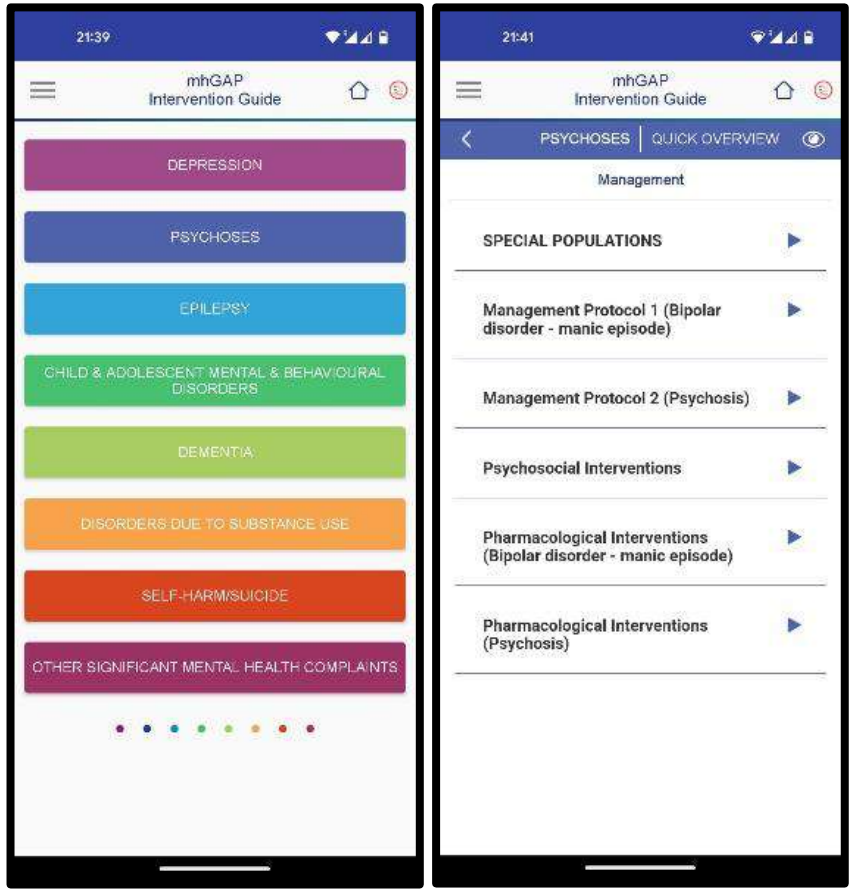
- Different level of care: PHC, specialised hospitals…
- Different users: assistant nurses, doctors, specialists…
- Different clinical scope

& also

- Clinical approach: Integrated, disease-specific, triage…
- Different devices: mobile phones, tablets, computers…
- Different place in the Health Information Management System: standalone, integrated with an EMR…



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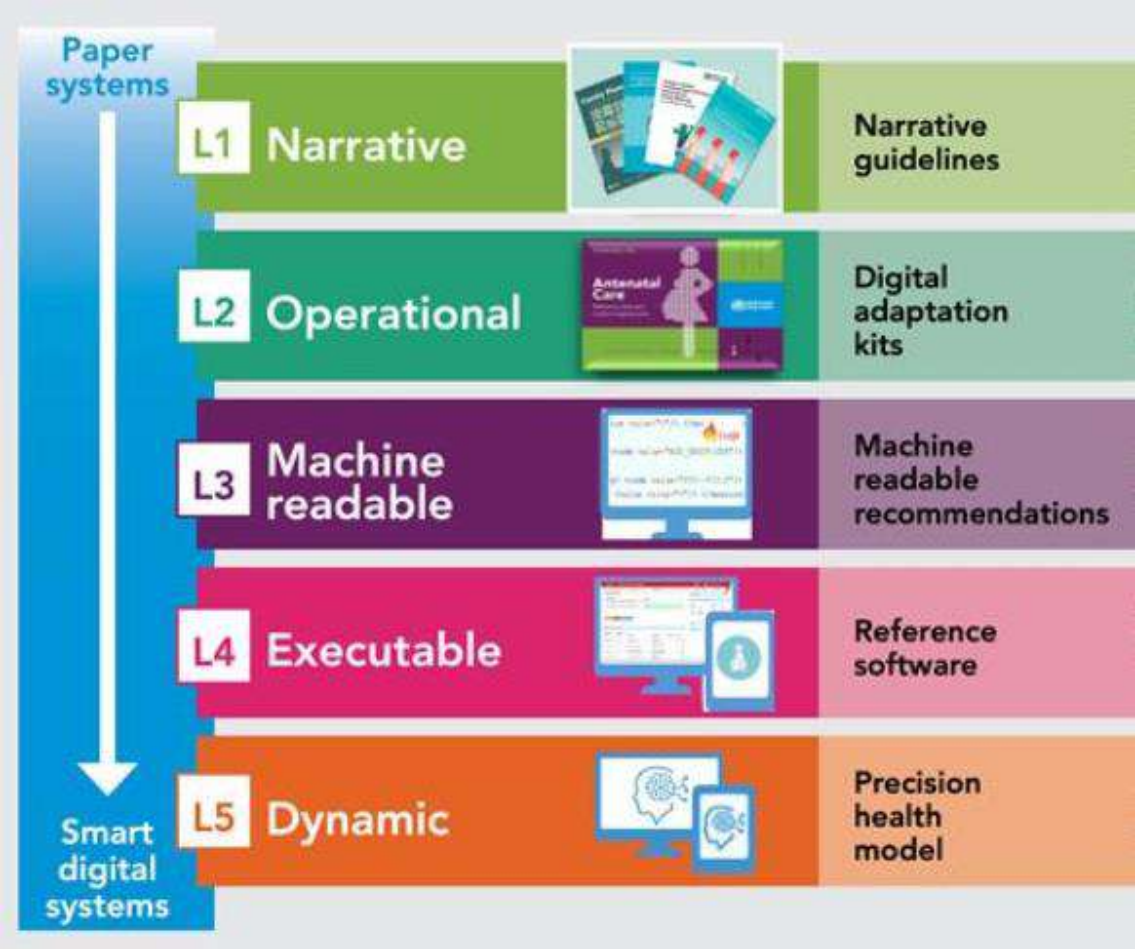
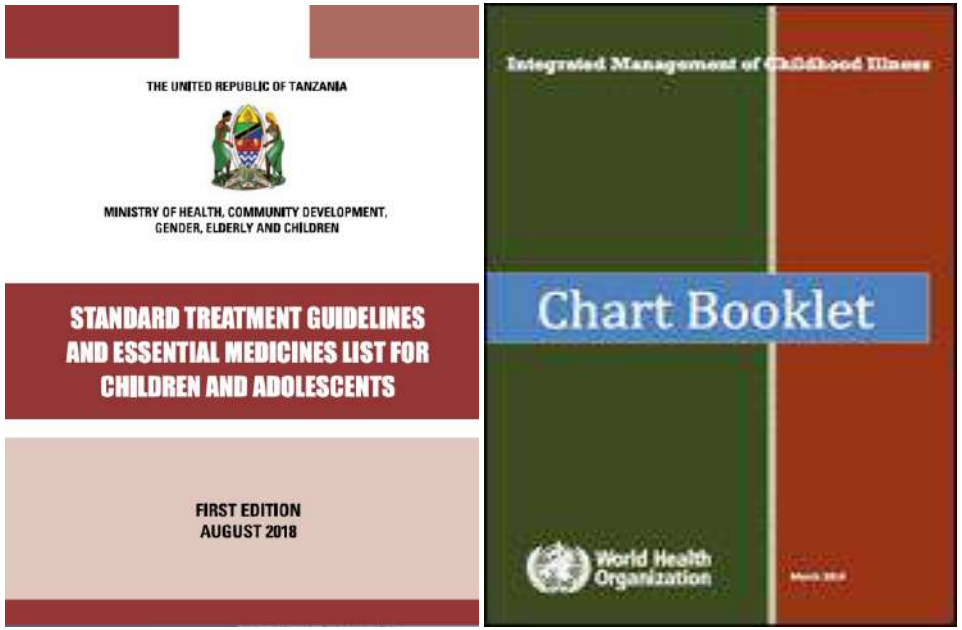
From paper guidelines to a digital app



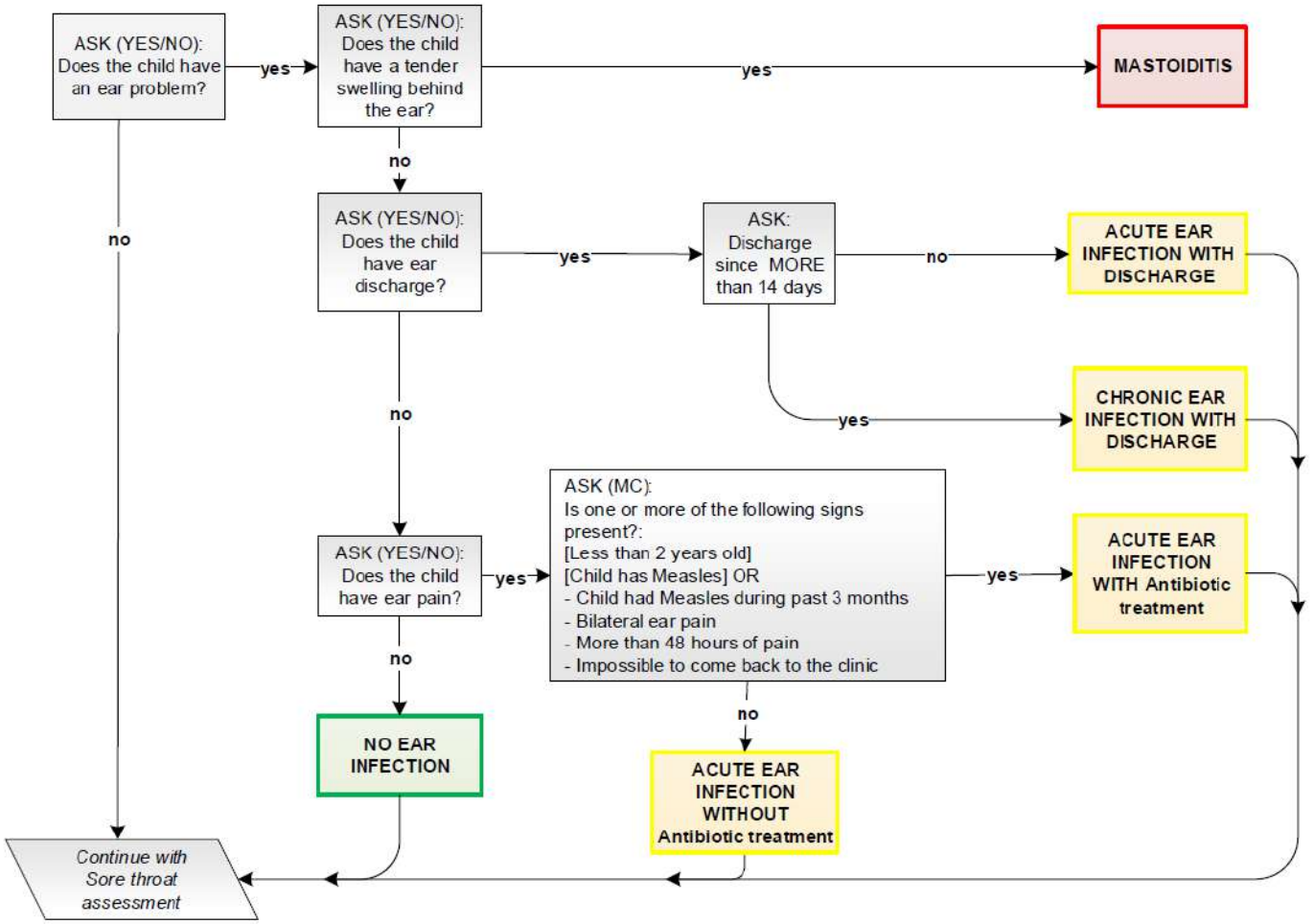
Step 1: Review and compile available guidelines

Working with Ministries of Health, National Technical Expert Groups, Research Institutions, WHO and others

Resolve issues
Update or adapt



Step 2: Convert guidelines into a decision-tree / algorithm



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Step 3: Convert into machine-readable format

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or (selected(.,'s_no_drink') and selected(.,'s_thirsty') )
or (selected(.,'s_skin_fold_fast_fade') and selected(.,'s_skin_fold_slow_fade') )))" jr:constraintMsg="jr:itext('/_ecda_wf_data/g_symptoms/f_ch_dehy
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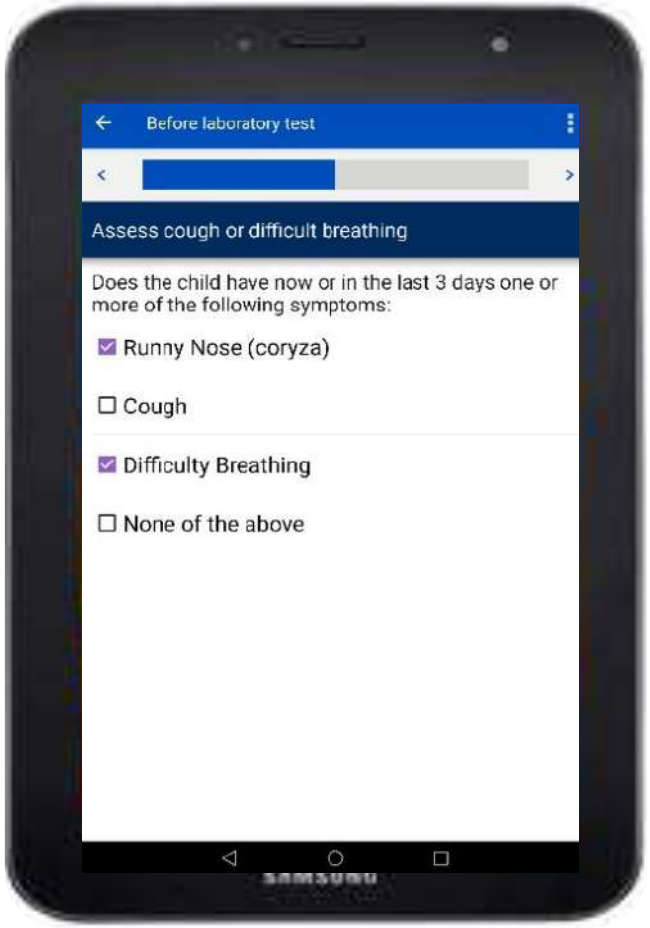
Step 4: Convert into an app



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Healthcare provider:

Before

After

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Health information: aggregated data

As «side-effect», large amounts of data can be collected

This data can inform:

- Epidemiological surveillance
- Planning of health services at regional or facility-level
- Training and mentoring of clinicians
- Public health interventions
- …

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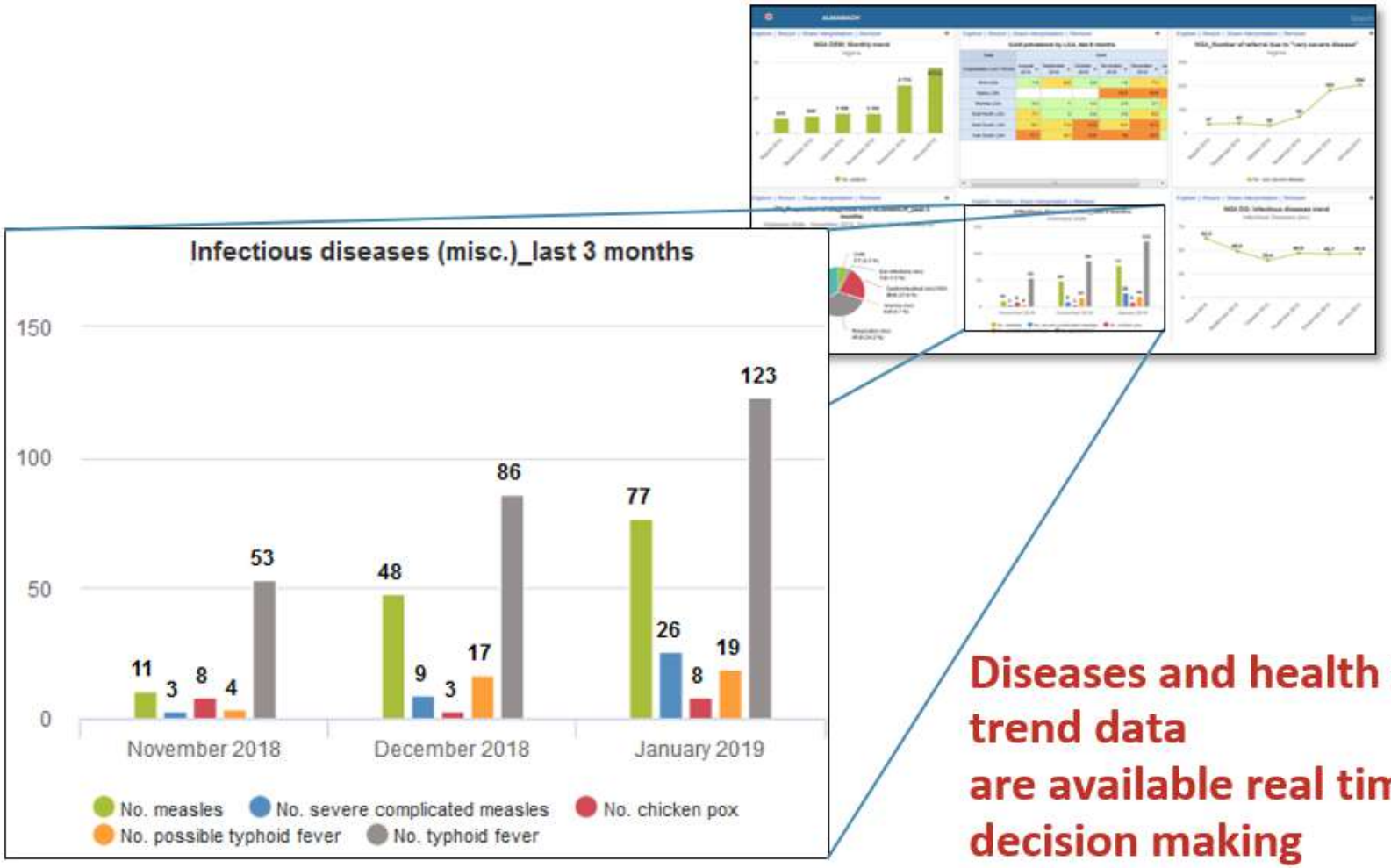
Aggregated data – example



Diseases and health services trend data are available real time to guide decision making

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A new and evolving body of research

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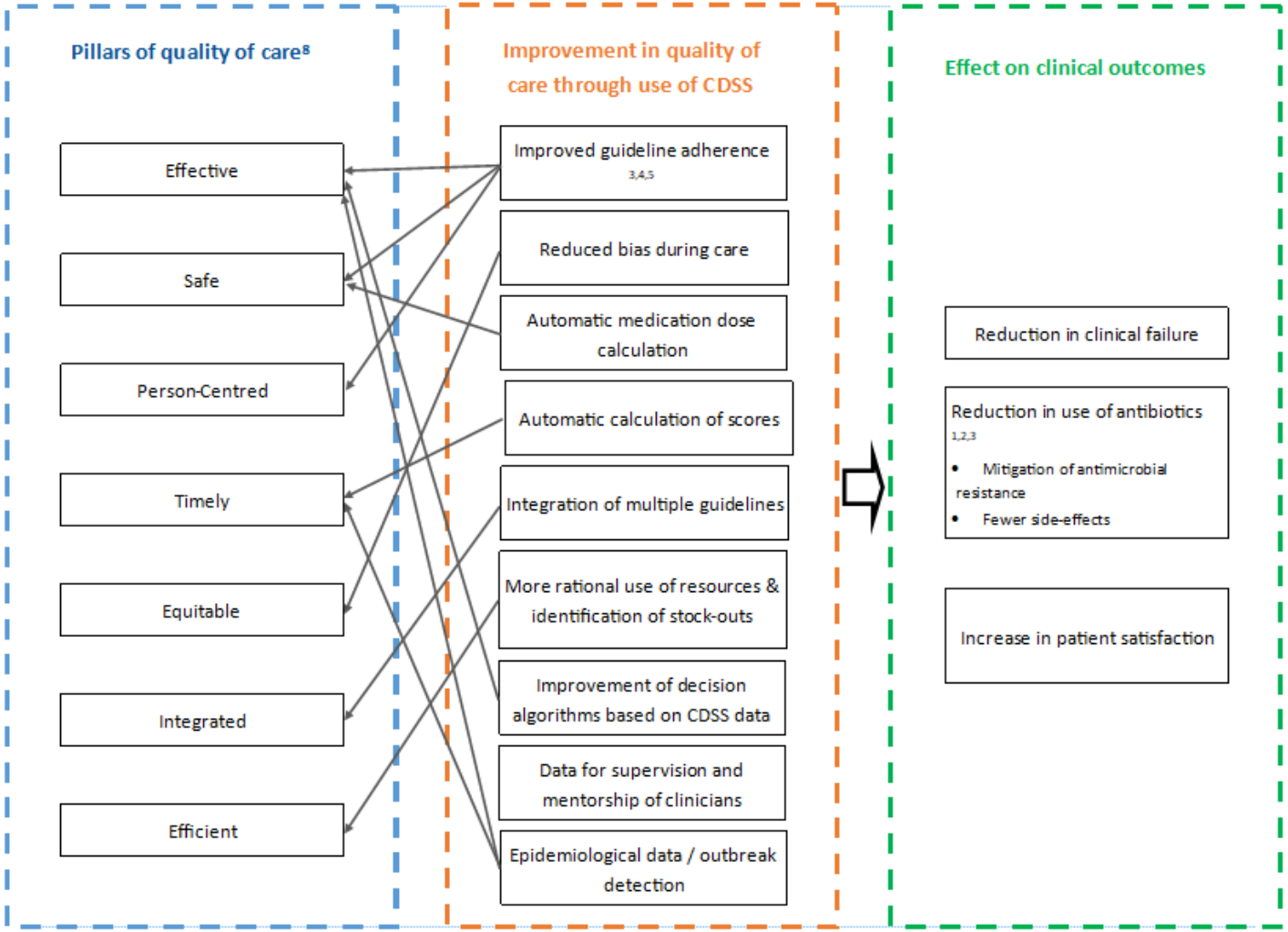
CDSS and quality of care

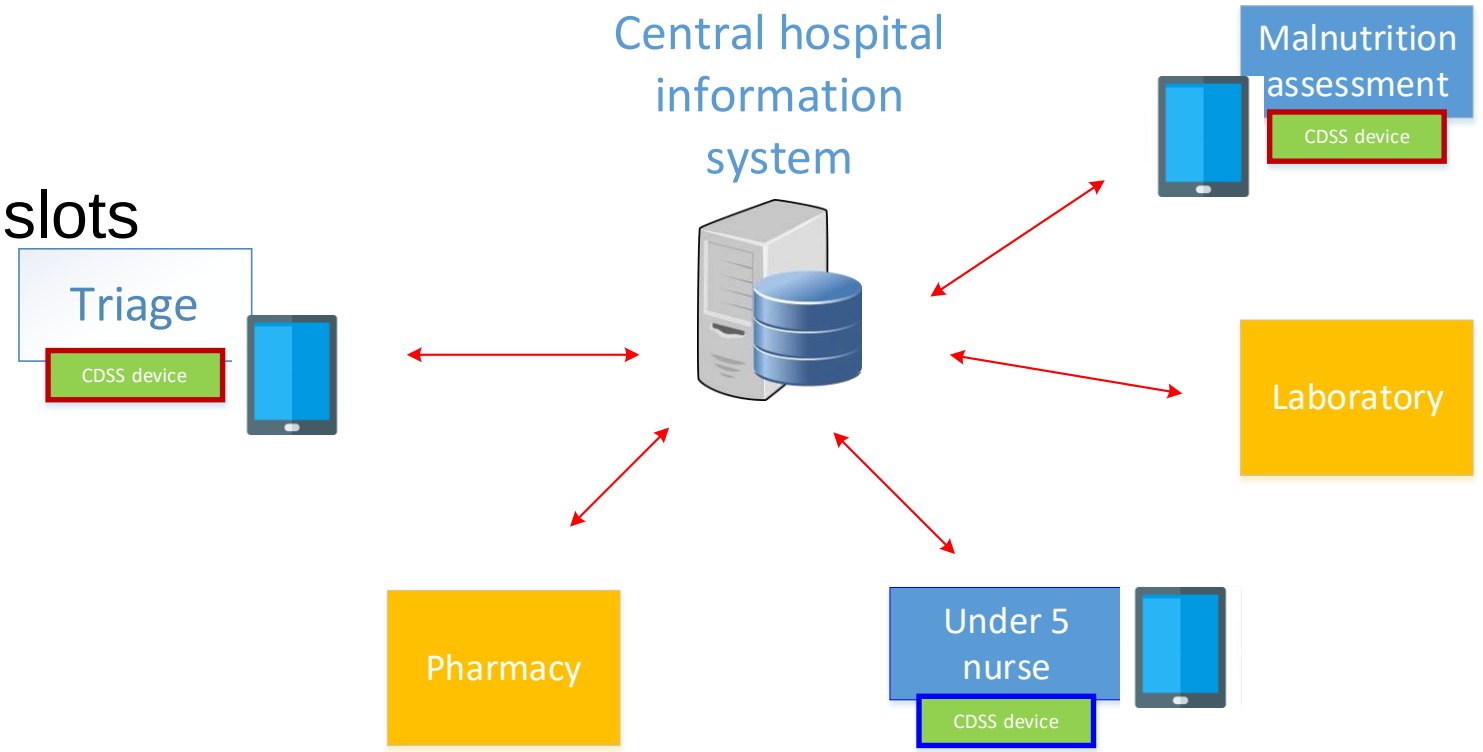


Beynon 2023

- Better communication with the patient / caregiver
- Enhanced referral

Interoperability in the digital health ecosystem

- Test results
- Prescriptions
- Stock management
- Patient capacity ex surgery slots
- Health insurance
- Epidemiological reporting
- ...



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CDSS for NCDs?

- Longitudinal follow-up
- Polypharmacy / drug interaction
- Standardised screening both for initial diagnosis and complications
- Comprehensive counselling
- Multimorbidity

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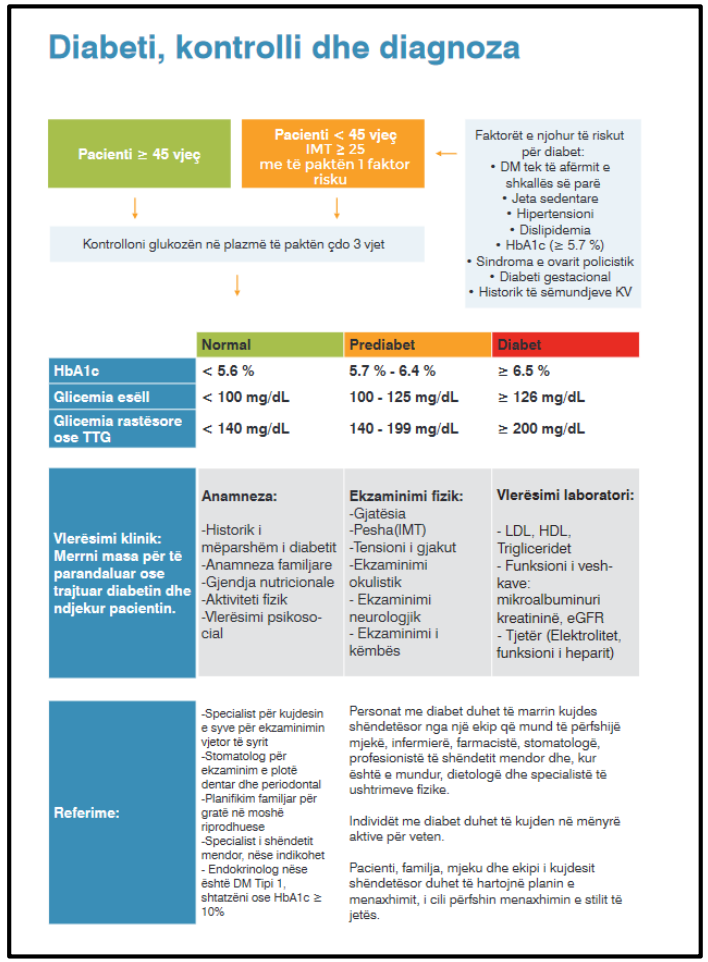
CDSS for diabetes?

- General triage / screening for (pre)-diabetes
- Management of acute cases (hypo/hyper)
- Screening for complications/non-acute follow-up
- Longitudinal follow-up ex: HbA1C history



Diabeti, kontrolli dhe diagnoza

Pacienti ≥ 45 vjeç

Pacienti < 45 vjeç
IMT ≥ 25
me të paktën 1 faktor risku

Faktorët e njohur të riskut për diabet:
- DM tek të afërmit e shkallës së parë
- Jeta sedentare
- Hipertensioni
- Dislipidemia
- HbA1c (≥ 5.7 %)
- Sindroma e ovarit policistik
- Diabeti gestacional
- Historik të sëmundjeve KV

Kontrolloni glukozën në plazmë të paktën çdo 3 vjet

	Normal	Prediabet	Diabet
HbA1c	< 5.6 %	5.7 % - 6.4 %	≥ 6.5 %
Glicemia esël	< 100 mg/dL	100 - 125 mg/dL	≥ 126 mg/dL
Glicemia rastësore ose TTG	< 140 mg/dL	140 - 199 mg/dL	≥ 200 mg/dL

Vlerësimi klinik: Merrni masa për të parandaluar ose trajtuar diabetin dhe ndjekur pacientin.	**Anamneza:** -Historik i mëparshëm i diabetit -Anamneza familjare -Gjendja nutricionale -Aktiviteti fizik -Vlerësimi psikoso-cial	**Ekzaminimi fizik:** -Gjatësia -Pesha(IMT) -Tensioni i gjakut -Ekzaminimi okulistik - Ekzaminimi neurologjik - Ekzaminimi i këmbës	**Vlerësimi laboratori:** - LDL, HDL, Trigliceridet - Funksioni i vesh-kave: mikroalbuminuri kreatininë, eGFR - Tjetër (Elektrolitet, funksioni i heparit)
Referime:	-Specialist për kujdesin e syve për ekzaminimin vjetor të syrit -Stomatolog për ekzaminim e plotë dentar dhe periodontal -Planifikim familjar për gratë në moshë riprodhuese -Specialist i shëndetit mendor, nëse indikohet - Endokrinolog nëse është DM Tipi 1, shtatzëni ose HbA1c ≥ 10%	Personat me diabet duhet të marrin kujdes shëndetësor nga një ekip që mund të përfshijë mjekë, infermierë, farmacistë, stomatologë, profesionistë të shëndetit mendor dhe, kur është e mundur, dietologë dhe specialistë të ushtrimeve fizike. Individët me diabet duhet të kujden në mënyrë aktive për veten. Pacienti, familja, mjeku dhe ekipi i kujdesit shëndetësor duhet të hartojnë planin e menaxhimit, i cili përfshin menaxhimin e stilit të jetës.	

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Thank you

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Digital Health Unit, Swiss TPH

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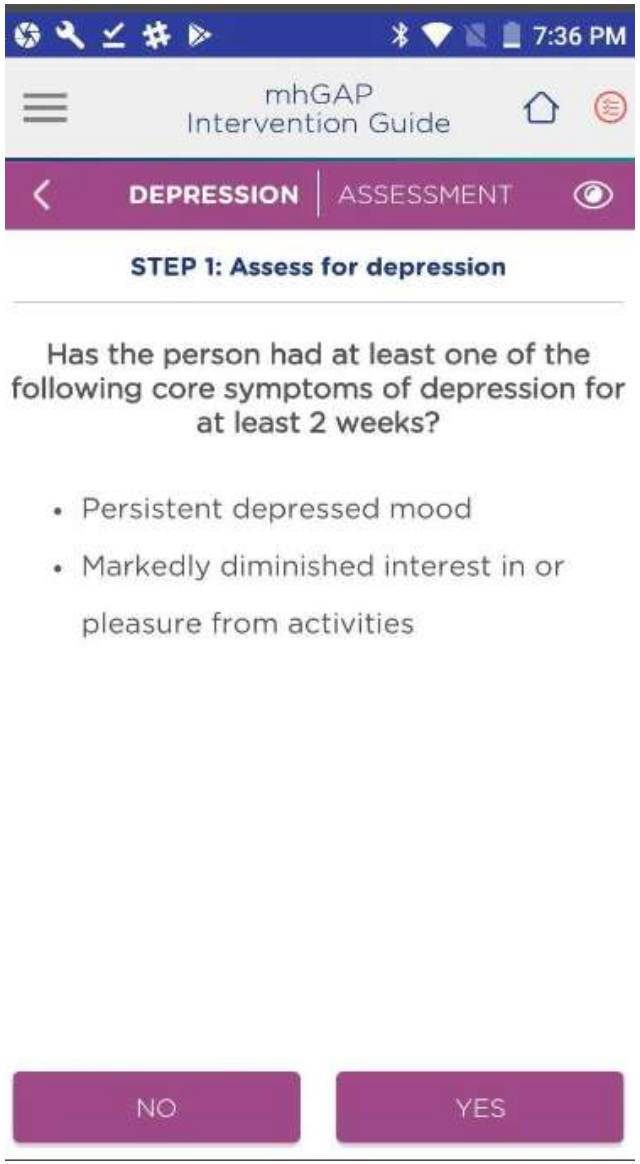
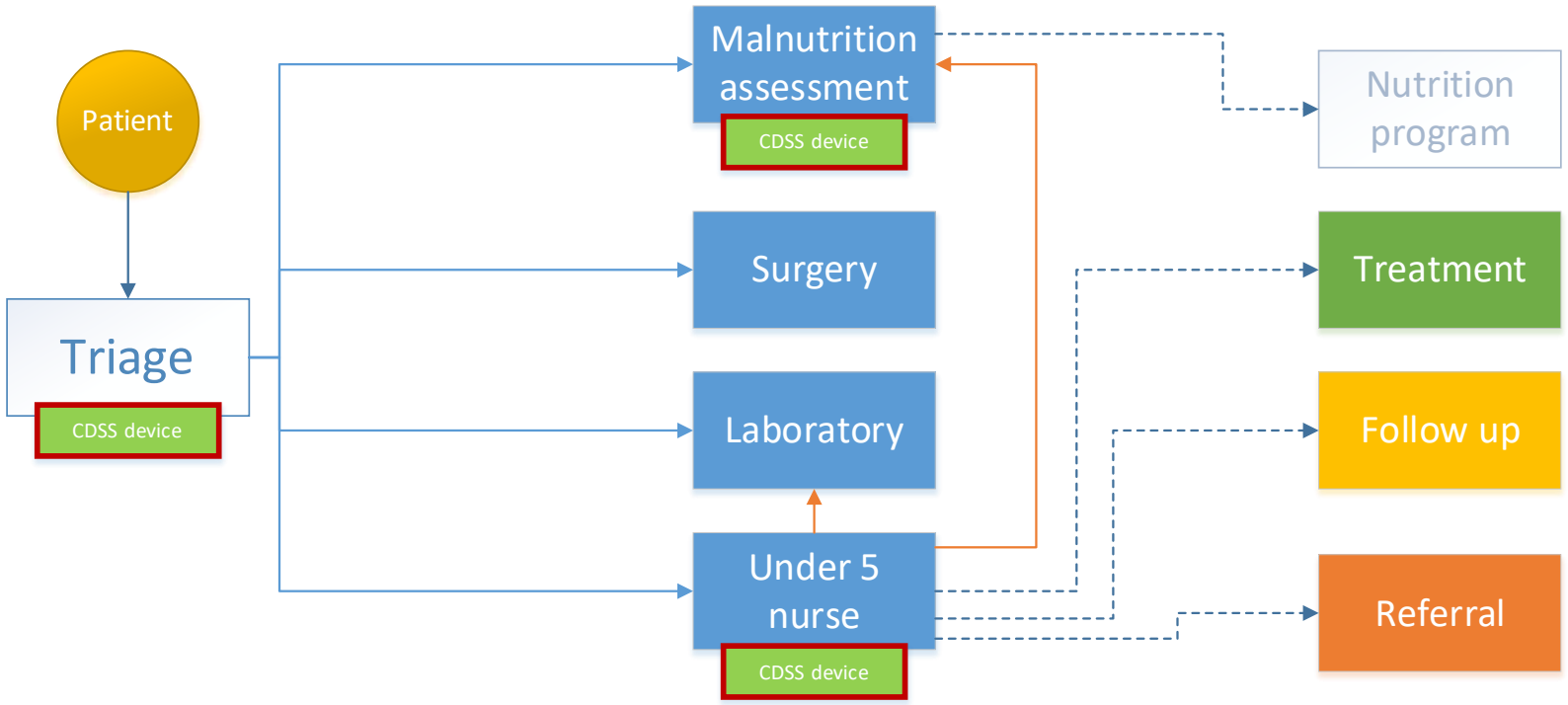
7:35 PM
mhGAP
Intervention Guide
DEPRESSION
QUICK OVERVIEW
DESCRIPTION
ASSESSMENT
MANAGEMENT
FOLLOW-UP


7:36 PM
mhGAP
Intervention Guide
DEPRESSION
ASSESSMENT
STEP 1: Assess for depression
Has the person had at least one of the following core symptoms of depression for at least 2 weeks?
• Persistent depressed mood
• Markedly diminished interest in or pleasure from activities
NO
YES

Integrating a CDSS in the care pathway



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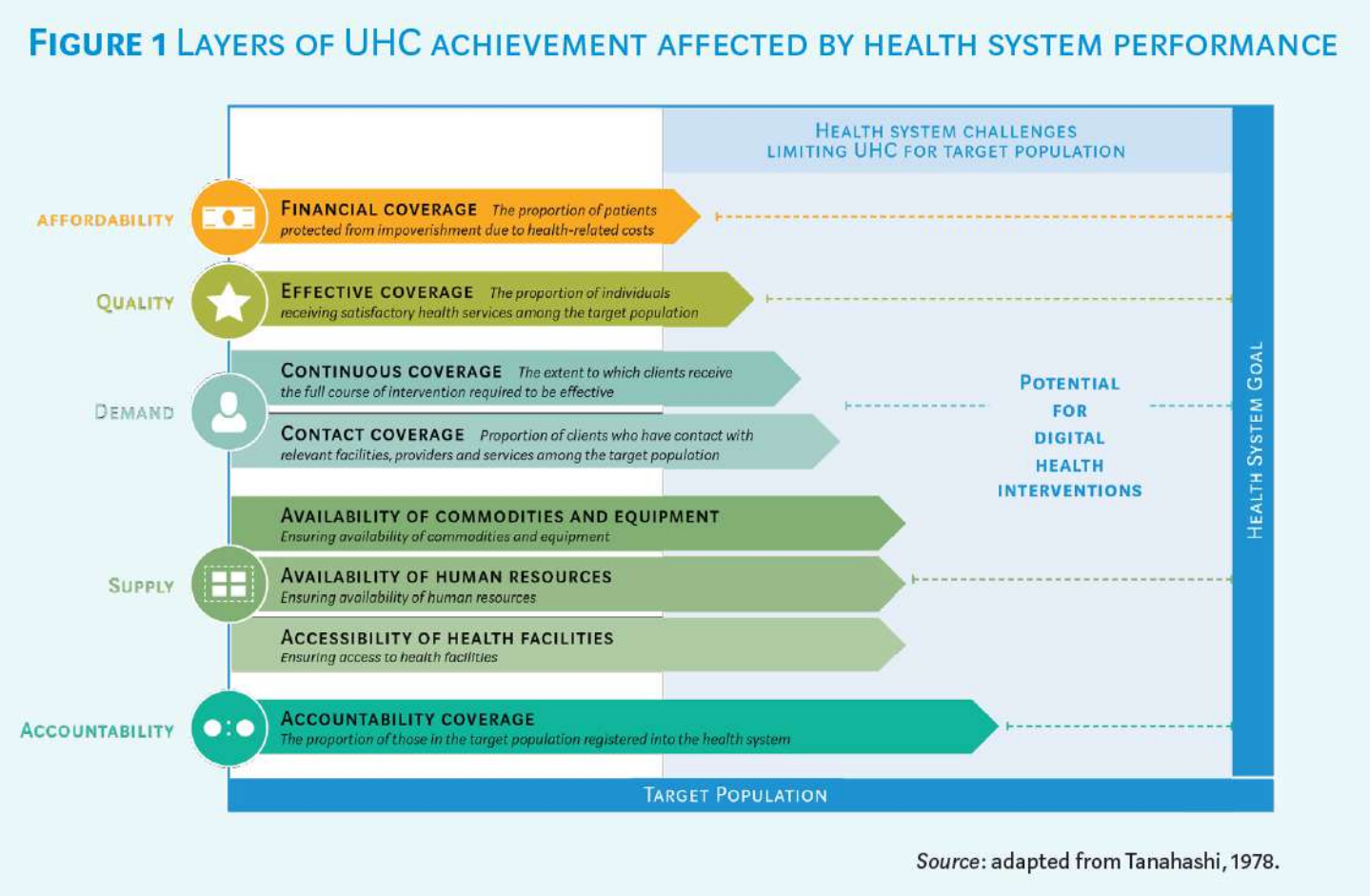
Universal Health coverage and CDSS



Quality of care

Slide title and custom content

Text for element title	Text for element title	Text for element title
▪ Element of table 1	▪ Element of table 1	▪ Element of table 1
▪ Element of table 2	▪ Element of table 2	▪ Element of table 2
▪ Element of table 3	▪ Element of table 3	▪ Element of table 3
▪ Element of table 4	▪ Element of table 4	▪ Element of table 4
▪ Element of table 5	▪ Element of table 5	▪ Element of table 5

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Supporting text for the slide.

Slide title and custom content

Title 1

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Title 2

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Title 3

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