

BMJ Best Practice

Integrating BMJ Best Practice into EHR systems

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BMJ Best Practice **Introduction**

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<https://bmj.com/hee>



Coronavirus disease 2019 (COVID-19).

> 900 condition topics
130 assessment topics
SNOMED-CT & ICD10 codes

OVERVIEW	THEORY	DIAGNOSIS	MANAGEMENT	FOLLOW UP	RESOURCES
Summary	Epidemiology	Recommendations	Recommendations	Monitoring	Guidelines
	Aetiology	History and exam	Treatment algorithm	Complications	Images and videos
	Case history	Investigations	Emerging	Prognosis	References
		Differentials	Prevention		Patient leaflets
		Criteria	Patient discussions		
		Screening			

Investigations

Consistent structure to follow the clinical process

Itemised Structure

Coronavirus disease 2019 (COVID-19)

OVERVIEW	THEORY	DIAGNOSIS	MANAGEMENT
Summary	Epidemiology	Recommendations	Recommendations
	Aetiology	History and exam	Treatment
	Case history	Investigations	Emerging
		Differentials	Prevention
		Criteria	Patient dis

Investigations

1st investigations to order

- real-time reverse transcription polymerase chain reaction (RT-PCR)
- pulse oximetry
- ABG
- FBC
- comprehensive metabolic panel

Itemised treatment shown in App

Itemised tests shown in Web version

08:38

Treatment algorithm

Acute

- mild COVID-19
- moderate COVID-19
- severe COVID-19

1st line: hospital admission

plus: consider oxygen therapy

plus: symptom management and supportive care

plus: venous thromboembolism prophylaxis

plus: monitoring

adjunct: antibiotics

adjunct: corticosteroid

Layers

Referenced clinical comments

Consider [^] corticosteroid

Treatment recommended for SOME patients in selected patient group

The World Health Organization (WHO) strongly recommends systemic corticosteroid therapy (low-dose intravenous or oral dexamethasone or hydrocortisone) for 7 to 10 days in adults with severe COVID-19. This recommendation is based on two meta-analyses that pooled data from eight randomised trials (over 7000 patients), including the UK RECOVERY trial. Moderate-quality evidence suggests that systemic corticosteroids probably reduce 28-day mortality in patients with severe and critical COVID-19. They also probably reduce the need for invasive ventilation. There is no evidence directly comparing dexamethasone and hydrocortisone. The harms of treatment in this context are considered to be minor. It is unclear whether these recommendations can be applied to children or those who are immunocompromised.

[485][486][523][524]

[BMJ rapid recommendations: a living WHO guideline on drugs for COVID-19](#)

In the UK, the National Institute for Health and Care Excellence recommends dexamethasone or hydrocortisone in patients with severe COVID-19 (in line with WHO guidance). The marketing authorisations cover this indication in the UK.[483]

[NICE: COVID-19 prescribing brief – corticosteroids](#)

In Europe, the European Medicines Agency has endorsed the use of dexamethasone for patients with severe disease who require oxygen therapy or mechanical ventilation.[525]

In the US, the National Institutes of Health guideline panel recommends using

Tiered treatment options

Primary options

dexamethasone: adults: 6 mg orally/intravenously once daily for 7-10 days

OR

hydrocortisone: adults: 50 mg orally/intravenously every 8 hours for 7-10 days

Secondary options

prednisolone: ac

OR

methylprednisolone: adults: 32 mg/day orally/intravenously given in 1-2 divided doses for 7-10 days

Coded drugs allow links to BNF

BNF BNF
Publication last updated on 08-Sep-2020 >

Subsections Related Content

Dexamethasone

Drug action

Indications and dose

<https://doi.org/10.18578/BNF.866237360>

Links out to guideline sources
Local guidelines can also be linked to a topic

Comorbidities

1. Prompt for other conditions

Add your patient's comorbidities

Treatment recommendations for Coronavirus disease 2019 (COVID-19) will change dependent on your patient's comorbidities

Select comorbidities

<input type="checkbox"/> Hypertension	<input checked="" type="checkbox"/> Diabetes
<input type="checkbox"/> Coronary artery disease	<input type="checkbox"/> Asthma
<input type="checkbox"/> Heart failure	<input type="checkbox"/> COPD
<input type="checkbox"/> Stroke	<input checked="" type="checkbox"/> Chronic kidney disease (CKD)
<input type="checkbox"/> Depression	<input type="checkbox"/> Dementia

Please remember that treatment regimes may change for comorbidities not yet covered by this list.

[SHOW TREATMENT ALGORITHM](#)

Coronavirus disease 2019 (COVID-19)

OVERVIEW THEORY DIAGNOSIS MANAGEMENT FOLLOW UP RESOURCES

Comorbidities: Diabetes, Chronic kidney disease (CKD) [EDIT](#)

Diabetes

Manage the patient's diabetes when they are taking corticosteroids
Giving corticosteroids to someone with diabetes will worsen their glycaemic control, so test blood glucose at least four times a day [66]

- For patients with diabetes, use the same doses of corticosteroid as for patients without diabetes but adjust diabetes medication, as their diabetes control will get worse.
- Synthetic corticosteroids can cause hyperglycaemia by affecting carbohydrate metabolism and inducing insulin resistance [66]
- COVID-19 is also associated with increased insulin resistance as well as reduced insulin secretion from the pancreatic beta cells [66]
- if hyperglycaemia does occur, rule out diabetic ketoacidosis or hyperosmolar hyperglycaemic state and follow your hospital protocol on managing blood glucose in patients with diabetes and COVID-19 taking corticosteroids [66]
 - The recommended protocol by the UK-based National Inpatient Diabetes COVID-19 Response Group uses subcutaneous insulin.
 - The group highlights that sulfonylureas are not recommended in this scenario due to potential impairment of beta cell function and likely severe insulin resistance [66]

When you stop the corticosteroid dose, glycaemic control will likely improve, although this may occur over a few days.

2. Additional layer specific to COVID-19, Diabetes and Corticosteroid use

Evaluation Processes

Design phase

- User centred - inspired by digital app development, digital product management
- Test in healthcare setting using clinical scenarios and volunteers

Live phase

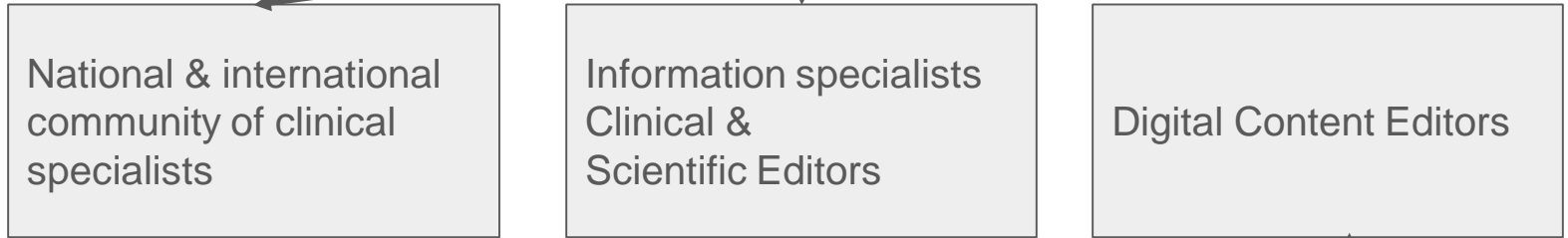
- Digital user analytics - how are users interacting with the recommendations
- Qualitative feedback - user interviews

Service orientated

- How does a digital tool interact with healthcare processes
- Quality Improvement model - plan, do, study, act

Keeping It Current

Stream of new guidelines,
evidence reviews, safety
alerts, feedback



People

Process

Collaborative document editing

Collaborative technical data editing

Technology



Word processor

Bespoke CMS

Preview Platform for Review and Testing



Informatics View

CDS Content Levels		Purpose	Integration granularity
Level 1	Narrative	Human communication of guidelines	Low
Level 2	Semi structured	Human communication of recommendations	Medium } BMJ Best Practice
Level 3	Codified	Linking patient context to recommendations	
Level 4	Executable	Active alerts	High

Early Integration Vision

Illustrative Patient Record System

The screenshot displays a patient record system interface. At the top left is the 'eCare' logo. The patient's name, 'Hailey Smart', is shown in a large blue box, with their Date of Birth (DOB: 02/12/1975) and Allergy (Penicillin) listed to the right. Below the name, there are two tabs: 'Tests' and 'CDS'. The 'CDS' tab is active, showing a 'Chronic obstructive pulmonary disease (COPD)' entry with a 'BMJ Best Practice' badge. Underneath this entry, a list of '1st investigations to order' is provided, including spirometry, pulse oximetry, ABG, CXR, FBC, and ECG. On the left side, a 'Problems' section lists COPD, Type 2 Diabetes, and Hypertension. The BMJ logo is visible in the bottom right corner.

eCare

Hailey Smart DOB: 02/12/1975
Allergy: Penicillin ⚠

Problems ... 📧

- COPD >
- Type 2 Diabetes >
- Hypertension >

Tests **CDS** ... ●

Chronic obstructive pulmonary disease (COPD) **BMJ Best Practice**

1st investigations to order

- ▼ spirometry
- ▼ pulse oximetry
- ▼ ABG
- ▼ CXR
- ▼ FBC
- ▼ ECG

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Early Integration Challenges (Secondary care)

Illustrative Patient Record System

eCare

Hailey Smart DOB: 02/12/1975
Allergy: Penicillin ⚠

Problems ... 📧

- COPD >
- Type 2 Diabetes >
- Hypertension >

▶ Use of problem lists

Tests **CDS** ▶ Standard EHR APIs ... ●

Chronic obstructive pulmonary disease (COPD) **BMJ Best Practice**

1st investigations to order

- ▼ spirometry
- ▼ pulse oximetry
- ▼ ABG
- ▼ CXR ▶ Standard CDS content APIs
- ▼ FBC
- ▼ ECG

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Current Incremental Approach to Integration

Illustrative Patient Record System

The screenshot shows the eCare interface for patient Hailey Smart (DOB: 02/12/1975, Allergy: Penicillin). The interface is organized into several panels:

- Actions:** A list of tasks including Referral, Clinical documentation, Care pathway, Results, Medication, and BMJ Best Practice.
- Search BMJ Best Practice:** A search bar with the placeholder text "Search conditions, symptoms...".
- Vitals:** A section titled "Today's Temperature" showing a line graph. A red callout box points to a peak on the graph labeled "Rx clarithromycin".
- Problems:** A list of medical conditions: COPD, Type 2 Diabetes, and Hypertension.
- Orders:** A list of medical orders: Chest X Ray, Full Blood Count, and Urea and Electrolytes.

General link to BMJ Best Practice front page

Embedded BMJ Best Practice search

Diagnosis specific links HL7 Infobutton

Benefits Evaluation & Current Status

- Qualitative feedback:
 - Links from EHR increase awareness that information is available and simplifies access
 - A search widget provides confidence answers will be available before leaving EHR
- Waiting to analyse more data from sites
- HL7 Infobutton - sites/pilots in development

HL7 Infobutton

Illustrative Patient Record System

The image illustrates an HL7 Infobutton integration. On the left, the **eCare** interface shows a patient record for **Hailey Smart** (DOB: 02/12/1975, Allergy: Penicillin). Under the **Problems** section, **COPD** is listed. A blue dashed arrow points from the COPD problem to a browser window on the right. The browser window shows the **BMJ Best Practice** website for **Chronic obstructive pulmonary disease (COPD)**. The website includes a search bar, navigation links (Recent updates, Specialties, Calculators, Comorbidities, Patient leaflets, Videos, Evidence, Drugs), and a table of contents for the COPD article.

eCare

Hailey Smart

DOB: 02/12/1975
Allergy: Penicillin !

Problems

- COPD
- Type 2 Diabetes
- Hypertension

Chronic obstructive pulmonary disease (COPD)

BMJ Best Practice

Search conditions, symptoms...

Recent updates | Specialties | Calculators | Comorbidities | Patient leaflets | Videos | Evidence | Drugs

English | Português | Español | Русский

OVERVIEW	THEORY	DIAGNOSIS	MANAGEMENT	FOLLOW UP	RESOURCES
Summary	Epidemiology Aetiology	Approach History and exam	Approach Treatment algorithm	Monitoring Complications	Guidelines Images and videos

HL7 Infobutton URL



<http://bestpractice.bmj.com/infobutton?>

knowledgeResponseType=text/html
&mainSearchCriteria.v.cs=2.16.840.1.113883.6.96
&mainSearchCriteria.v.c=13645005
&mainSearchCriteria.v.dn=COPD
&taskContext.c.c = PROBLISTREV
&subTopic.v.c = Q000175
&informationRecipient = PROV

In progress::

&patientPerson.administrativeGenderCode.c=F
&ageGroup.v.c=D000328

Return a Web page

I'm sending a SNOMED-CT code

The item code

The item term

The user is reviewing the
problem list

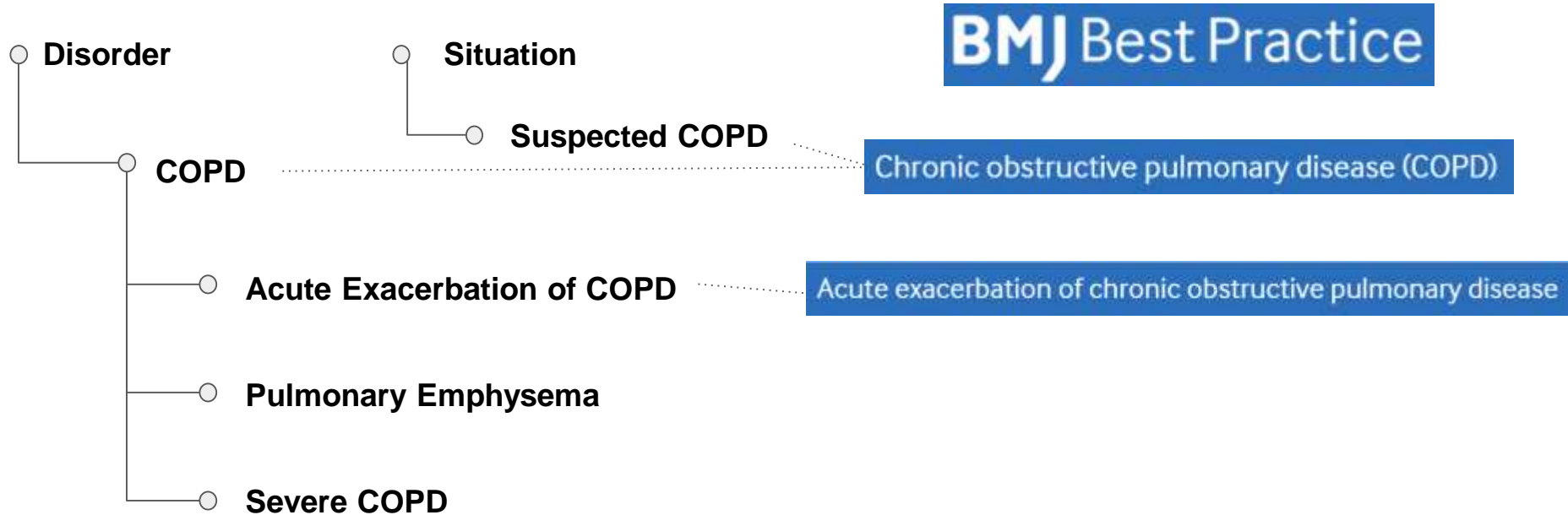
Provide diagnosis information

Information is for a healthcare
provider

The patient is female

The patient is an adult

Behind the Scenes - Using SNOMED-CT Hierarchies



HL7 Infobutton Evaluation

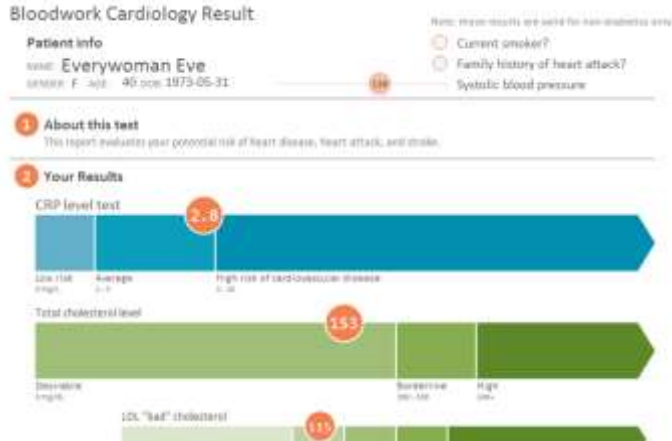
Cook, D. A., et al. (2017). **Context-sensitive decision support (infobuttons) in electronic health records: A systematic review**. Journal of the American Medical Informatics Association, Vol. 24. <https://doi.org/10.1093/jamia/ocw104>

- 17 relevant studies in US institutions
- Usage between 0.3 & 7.4 / user / month
- Used most often during prescribing and lab ordering tasks
- Used less often than more general links
- Found to answer questions 2/3rds of the time
- Change decision in 15-91% of cases
- Time to answer between 25 and 97 seconds
- No studies directly assessed clinical impact
- Concludes that more evaluation to be done

Emerging EHR Integration Technical Standards

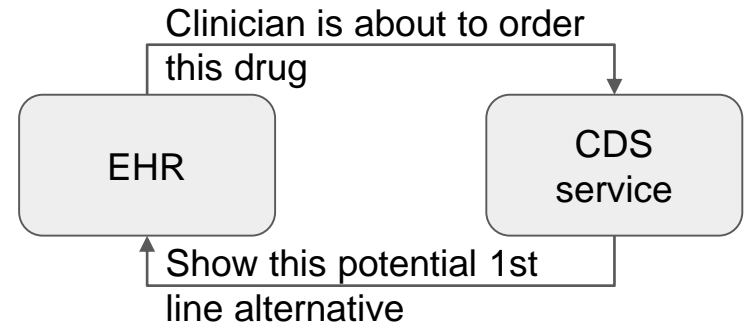
SMART on FHIR

- Tech profile for secure launch of apps from the EHR
- Uses HL7 FHIR as the data standard



CDS Hooks

- EHR triggers to invoke CDS services
- Answer as concise summary cards with more info available



Summary

- Need to maintain a human focus to CDS content and integration
- Constant need to evaluate how clinicians interact with it
- The community should take advantage of the standards to reduce technical barriers to integration and achieve scale

Questions