Chances of EMR settings and CDSS for the Practice of Clinical Pharmacy

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Context: a patient-centered (medication-) process



Use of ICT in medication process "Traditional model"





Potential benefits:

Depend on optimising the EMR system:

- Available functionality is switched on
- Functionality is appropriately used
- Integration with other relevant health information technology
- Alignment with clinical workflows
- \rightarrow cannot be formed instantaneously
- → requires considerable nurturing and a life-cycle perspective to support safety, quality and efficiency goals



Williams et al, BMJ Health Care Inform 2020

4 features strongly associated with a CDSS' ability to improve clinical practice

- a) decision support provided automatically as <u>part of clinician workflow</u>
- b) decision support delivered <u>at the time and location</u> of decision making
- c) <u>actionable</u> recommendations provided

d) computer based (use a computer to generate the decision support)
A common theme of all four features is that they make it easier for clinicians to use a clinical decision support system, suggesting that an effective system must minimise the effort required by clinicians to receive and act on system recommendations.

Chances for the clinical pharmacist:

- Efficient work process
- Improved prescribing process
- Insight in treatment regimens -> improves professional relationship with prescriber and patients
- Clinical decision support -> counseling of prescribers
- Support of treatment adherence
- Blended care: digital where possible, human where necessary

Safe and effective medication process, improved patient safety

Source: dr. Claudia Rijcken "Pharmaceutical care in digital revolution" (book)

Pharmacists' key role in optimisation:



- dynamic in nature
- interrelated
 - design- and implementationrelated activities need to take the evolving nature of systems into account

Williams et al, BMJ Health Care Inform 2020 (adapted from Cresswell et al: J R Soc Med 2014)

Examples of risk-reducing measures (1)

Prescribing:

- Generic prescribing
- Enrich and specify generic drug names
- Limit list of available items in CPOE
- Predefined doses per frequency in CPOE
- Prescribing from panels and smartsets
- Combined orders for medication and controls
- Prescription linked to indication





Examples of risk-reducing measures (2)

Medication warnings:

- Warnings up to date according to national database (G-standard)
- Clinical decision support integrated into CPOE
- Real-time in-line clinical rules

Medication administration:

- Compounding instructions
- Patient instructions

Appropiateness of orders

• Dose warnings: in-line



Double meds, interactions, contra-indications at sign-off by prescriber



Summary report for pharmacist:

Sig.dat & tijd 🕇	Туре	Ordernaam	Orderinformatie	Overschr.reden	Opmerking	Patiënt ID	Patiënt	Leeftijd	Huidige afd. van pa
13-11-20 16:42	Dosis	paracetamol tablet	1.500 mg, Oraal, 4x per dag		-	53950.99	Adtmaster, Niek [1104358]	64 jr	C1 A IC
	Dubbelmedicatie	paracetamol tablet paracetamol zetpil	1.500 mg, Oraal, 4x per dag 1.000 mg, Rectaal, 4x per dag		-	53950.99	Adtmaster, Niek [1104358]	64 jr	C1 A IC
	Medicatie-Medicat	metoprololsuccinaat tablet mga (selokeen) insuline aspart injvlst flexpen 300e=3ml (100e/ml) (novorapid)	50 mg, Oraal, 1x per dag 0-8 Eenheden, Subcutaan, 1x per dag			53950.99	Adtmaster, Niek [1104358]	64 jr	C1 A IC
		metoprololsuccinaat tablet mga (selokeen) insuline aspart injvlst flexpen 300e=3ml (100e/ml) (novorapid)	50 mg, Oraal, 1x per dag 0-8 Eenheden, Subcutaan, 1x per dag	-		53950.99	Adtmaster, Niek [1104358]	64 jr	C1 A IC
		insuline aspart injvlst flexpen 300e=3ml (100e/ml) (novorapid) metoprololsuccinaat tablet mga (selokeen)	0-8 Eenheden, Subcutaan, 1x per dag 50 mg, Oraal, 1x per dag		-	53950.99	Adtmaster, Niek [1104358]	64 jr	C1 A IC
13-11-20 16:46	Contra-indicatie	dexamethason injvlst 4mg/ml (base)	0,1 mg/kg × 2,565 kg (Doseergewicht), Intraveneus, Eenmalig	-	-	55834.99	Duindoorn, Jessica [2460000]	0 dg	Q1 NEO ICU
		dexamethason injvlst 20mg/ml (base)	0,5 mg/kg × 2,565 kg (Doseergewicht), Intraveneus, Eenmalig		-	55834.99	Duindoorn, Jessica [2460000]	0 dg	Q1 NEO ICU
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Extra check by pharmacy technicians and pharmacists < 24 hrs

Report for individual patient:



Source of data: G-standard

- National database (>100.000 items) based on literature and validated by an expert team
- Clinical rules:
 - 2^e generation med warnings
 - Sophisticated algorithms combining medication and patient criteria (renal function, electrolytes, liver function)
 - Sophisticted algorithms determining the absence or presence of comedication when indicated
- Monthly updates

Less alert fatigue by clinical rules

Plan

Redundant signals, increasing the risk of

• alert fatigue (90% reported override rates)



may facilitate overriding of potentially critical notifications

Do

- Introduce clinical rules (CR)
- Monitor compliance

Check

Developed 10 clinical rules

Act

Data are continuously measured and evaluated

Clinical rule (CR):	Fired (n [%])	CR correctly acknowledged (n [%])	CR correctly followed-up (n [%])
PPI for prevention of peptic ulcer	113 (100)	100 (88)	112 (99)
ligh serum potassium	63 (100)	60 (95)	63 (100)
ow serum potassium	7 (100)	5 (71)	7 (100)
NR out of therapeutic range	204 (100)	182 (89)	204 (100) Pariodic check b
			clinical pharm
			Radi

Patient lists for identification of specific care needs:

		Check on re function	enal n		Check on ad of folic ad	
acht	Gewicht (kg)	Afdeling	CrCl	Methotrexaat	Heeft foliumzuur?	
	69,9	E00 HEMATOLOGIE VA	100 ml/min	methotrexaat 3.740 mg in NaCl 0,9% 500 ml infuus Eenmalig	∇	
	70,4	INTERNE SPECIALISMEN DAGBEHANDELING	100 ml/min	methotrexaat 276 mg in NaCl 0,9% 50 ml infuus Eenmalig	∇	
	51,7	E00 HEMATOLOGIE VA	100 ml/min	methotrexaat 3.120 mg in NaCl 0,9% 500 ml infuus Eenmalig	∇	
	78,3	DEKKERSWALD U10 LONGZIEKTEN VA	43 ml/min	methotrexaat injvlst wwsp 15mg=0,6ml (25mg/ml) Elke 7 dgn	~	
	98	EOV AIG VA	71 ml/min	methotrexaat tablet Één keer per dag op wo	~	
	90,8	DEKKERSWALD U30 LONGREVALIDATIE VA	100 ml/min	methotrexaat tablet Elke 7 dgn	~	
				Pa metho on do	itients on otrexate: ch osing sched	



Of course:

- Introduction and maintenance are complex processes
- Implementation could have unintended consequences
- Need for high level change management
- The systems are expensive and optimalisation work is time-consuming
- There is still a lack of standardisation
- The market is still immature and fragmented
- Take care of clear responsibilities and collaboration between the Director of pharmacy – process owner medication – CxIOs (Chief x information officers)

Conclusions:

Make sure humans stay in the loop (Cathy O'Neil) ! There is a need for organisational and legal "embedding". But we keep responsibility ourselfs. Organisations need to think about these developments and to adjust to them.

This way: Technology will ease our work.

But also: More technology asks for more humans to work with.