

Clinical Care Coordinators: Supporting the Implementation of Computerized Clinical Decision Support

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Background

- Computerized Decision Support Systems (CDSS) hold promise for improving patient safety and chronic disease management in primary care practice
- Development of quality CDSS and uptake of CDSS among primary care physicians has been slow
- While CDSS may improve adherence to best practices, adherence may not persist over time while effects on patient outcomes are inconsistent

Background

- Barriers to uptake of CDSS in primary care include time constraints, challenges of integrating new technology into existing practice workflow, & lack of demonstrated value for cost
- With increased emphasis on shared-decision making and self-management, CDSS are being directed at both patients and their health-care providers
- Support from qualified health care professionals (clinical care coordinators) may be important for both clinician and patient uptake and successful implementation of CDSS

Objectives

- To describe the theory and evidence behind the development of the Clinical Care Coordinator role
- To describe how the clinical care coordinator role is implemented within a vascular risk management program
- To present methods for evaluating the clinical care coordinator role within a complex intervention study of CDSS (COMPETE III)

Development of Clinical Care Coordinator Role

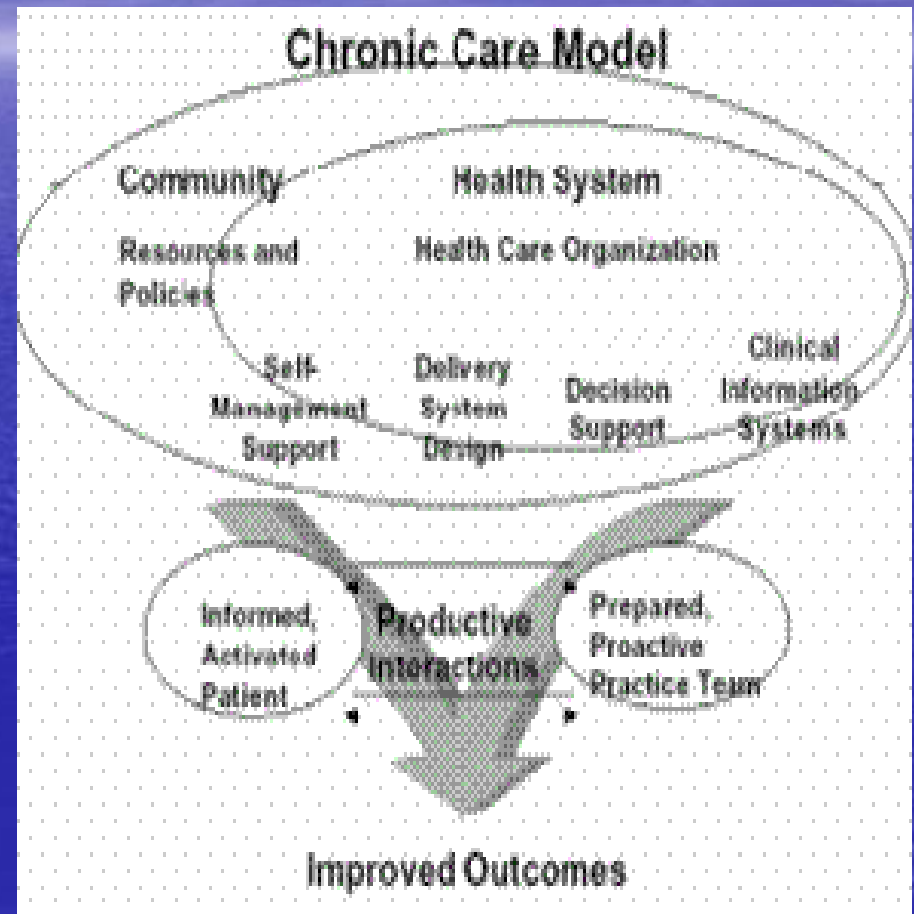
- Patient relationship management model
- Chronic care model

Patient Relationship Management Model

- Patient segmentation strategy
 - Understand who target patients are, what their needs are, how to individualize care to meet each patient's unique needs
- Reorganization of care to support patient-healthcare provider relationships
 - Shift in focus from patients seeing healthcare providers for acute illness to HCPs proactively screening patients to prevent illness
- Avoiding over-reliance on technology
 - Technology is only a tool, should not replace interaction with HCPs
- Delivery of services in a manner consistent with preferences of patient

Chronic Care Model

- Healthcare organization
 - Primary care reform sites with increased focus on multidisciplinary team-based care
- Clinical Information systems
 - Electronic Health Records (EHRs)
- Clinical Decision Support
 - Evidence-based algorithms
- Self-management support
 - Patient education and empowerment, goal-setting
- Community resources
 - Point of access and referral



Evidence supporting CCC role (1)

- Literature supports expanded role for nurses and pharmacists working collaboratively in teams with physicians to manage patients with chronic disease
- Specialist nurses providing regular telephone follow-up with CHD patients to monitor progress, set goals for therapy, and referral to physician for appropriate medications improved cholesterol control and patient quality of life (Vale et al. Arch Intern Med 2003;163:2775-83)
- Regular record review and outreach visits conducted by pharmacists with physicians increased the appropriateness of prescribed medications; patient education improved medication adherence (Beney J et al. Cochrane Review, Issue 2, 2003)

Evidence supporting CCC role (2)

- Academic detailing and audit and feedback by other healthcare providers among most effective interventions for promoting physician behaviour change and changing prescribing practices (Hunt DL et al. JAMA 1998;280:1339-46)
- Numerous controlled clinical trials have shown that patient-directed management strategies improve functional status, quality of life, and clinical outcomes by helping patients apply their knowledge of their condition for practical use.

COMPETE III overview

- COMPETE III (Computerization of Medical Practices to Enhance Therapeutic Effectiveness)
- 12-month RCT comparing a multifaceted vascular management program with usual care on improving quality and safety of vascular care of patients
- 1146 patients and 50 family physicians in Southern Ontario
- Physicians in primary care reform sites and using electronic health records (EHRs)
- Patients 55 years and older with vascular disease (heart disease, stroke, peripheral vascular disease) or at least one vascular risk factor (hypertension, high cholesterol, diabetes)

CDSS in COMPETE III (1)

Vascular Tracker

- Computerized vascular tracking system showing where the patient meets or does not meet targets for 15 monitoring variables of vascular care (e.g. blood pressure, cholesterol, taking aspirin)
- Updated regularly with patient-specific information which are run through evidence-based algorithms to generate patient-specific advice messages on how to improve the control of vascular risk factors
- Appears in real-time on Web interface, at point of decision-making, both patients and physicians have access to same view

Clinforma - Vascular Tracker for COMPETE III - Microsoft Internet Explorer

Address: https://www.clinforma.net/COMPETE3/cccv/t/(on30yw455dzuc0451wax1dqe)/p11.aspx

COMPETE Vascular Tracker for COMPETE III Powered by *clinforma.NET* [Logout](#)

User ID: hforster.006 Patient ID: 06-04-003 Last updated on: 2005-Dec-02, 08:31

Patient Practice Resources Messages

Vascular Tracker Risk Calculator

Site ID: 06 MD: 4 - Dr. I. Schabert [Show Page Size](#)

Patient: FC Mr. Smith

Known Vascular Risks and History:

no	Heart attack	Yes	Diabetes
no	Heart disease	Yes	High blood pressure
Yes	Poor circulation	no	Stroke
		Yes	High cholesterol

Tracker Item	My Status		My Goals - check every	Information & Recommendation
	Previous	Most recent		
FP Visit	2005-Jun-24 <small>2005-Jun-24</small>	2005-Sep-27 <small>2005-Sep-27</small>	3 mo.	Resources
A1c	0.077 <small>2005-May-07</small>	0.077 <small>2005-Sep-23</small>	< 0.07 3-6 mo.	Resources Advice
Blood Pressure	170/70 <small>2005-Jul-06</small>	130/65 <small>2005-Sep-27</small>	< 130/80 3 mo.	Resources Advice
LDL-cholesterol	3.94 <small>2004-Mar-04</small>	1.73 <small>2005-Apr-01</small>	< 2.5 mmol/L 6-12 mo.	Resources Advice
Smoking	0 cigs/day <small>2004-Oct-04</small>	0 cigs/day <small>2005-Mar-16</small>	0 cigs/day 3 mo.	Resources Advice
Weight	Not available <small>Not available</small>	Not available <small>Not available</small>	< 25 kg/m2 / <88 cm / <0.90 3 mo.	Resources Advice
Diet	Not available	6 fruits&vegs/day <small>2005-Mar-16</small>	>=4 fruits&vegs/day 3 mo.	Resources Advice
Exercise	Not available <small>Not available</small>	240 <small>2005-Mar-16</small>	> 240 min/wk 3 mo.	Resources Advice
Psychosocial	No Problem <small>2005-Mar-16</small>	No Problem <small>2005-May-07</small>	No Problem 3 mo.	Resources Advice
ASA/Antiplatelet	Taking <small>2005-Jun-24</small>	Taking <small>2005-Sep-27</small>	Taking 3 mo.	Resources Advice
Urine albumin	0.5 g/mol Cr	0.4 g/mol Cr	<2.8g/mol Cr	Resources Advice

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CDSS in COMPETE III (2)

Vascular risk calculator

- Automatically calculates patient's 10-year risk of a vascular event based on personal risk factors entered
- Recalculates overall risk with changes in individual risk factors

The screenshot displays the Clinforma Vascular Tracker for COMPETE III web application. The interface includes a navigation menu with options like Patient, Patient List, Resources, and Messages. The main content area shows a patient's current status and a simulation of what the risk would be if certain factors were changed.

My Current Status Is...		Reset	What If My Status Were...		Calc
Gender	M		Gender	<input checked="" type="radio"/> M <input type="radio"/> F	
Age (years)	50		Age (years)	<input type="text" value="50"/>	
Total cholesterol	5.3		Total cholesterol	<input type="text" value="4.7"/>	
HDL cholesterol	1.33		HDL cholesterol	<input type="text" value="1.33"/>	
Smoker (in past month)	Y		Smoker (in past month)	<input type="radio"/> Y <input checked="" type="radio"/> N	
Systolic blood pressure	140		Systolic blood pressure	<input type="text" value="140"/>	
Blood pressure is treated	Y		Blood pressure is treated	<input checked="" type="radio"/> Y <input type="radio"/> N	
History of heart attack	N		History of heart attack	<input type="radio"/> Y <input checked="" type="radio"/> N	
History of stroke	N		History of stroke	<input type="radio"/> Y <input checked="" type="radio"/> N	
Presence of diabetes	N		Presence of diabetes	<input type="radio"/> Y <input checked="" type="radio"/> N	
Risk of a vascular event in the next 10 years	16%		Risk of a vascular event in the next 10 years	6%	

CDSS in COMPETE III (3)

Vascular health resources

- Prescribing support resources and evidence-based summaries for physicians
- Educational and monitoring tools for patients

The screenshot displays two overlapping browser windows. The background window is titled "Vascular Tracker for COMPETE III - MD Resources" and shows a page with a yellow background. The page title is "MD Vascular Tracker Resource for COMPETE III". It lists several categories of resources:

- Physician Resources**
- Diabetes**
 - [Clinical Practice Guidelines](#)
[2003 Canadian Diabetes Association Guidelines](#)
 - [Diabetes management algorithms](#)
[Insulin Start Guide](#)
[Management of hyperglycemia in Type 2 Diabetes - Algorithm](#)
[Suggested Clinical Approach for Detection and Management](#)
 - [Drug comparison charts](#)
[Insulin comparison table](#)
[Hypoglycemic agent summary – comparison ... and monitoring](#)
[Hypoglycemic agents for type 2 diabetes – brief overview](#)
 - [Cost comparison of antidiabetic medications](#)
[Oral Hypoglycemic Cost Comparison Chart](#)
[Oral Hypoglycemic Cost Comparison Graph](#)
[Section 8 form for Oral Antidiabetic Medications](#)
 - [Evidence-based summaries for HbA1c](#)
[Evidence for HbA1c as a CV risk factor](#)

The foreground window is titled "Insulin Start Guide" and shows the following content:

Insulin Start Guide
Insulin Initiation Options in People With Type 2 Diabetes

The sample insulin regimens described here are examples only. Other options are possible. All people starting insulin should be consulted about the selection and prevention of hypoglycemia.

Dose A: Single bedtime injection of insulin added to oral antidiabetic agents (1-1.2 units/kg)
• 3000 or total insulin (up to 1.0) per kg at bedtime

Dose B: 21 units (insulin per day) premixed dose (eg, 30/70 NPH) (0.5 units/kg)
• 1/2 of total insulin dose at the evening
• 1/2 of total insulin dose with evening meal

Dose C: Intermittent insulin regimen (0.5 units/kg)
• 0.5 of total insulin dose at evening (up to 1.0) per kg at bedtime
• 20% of total insulin dose at bedtime insulin (2-3 insulin) (up to 1.0) per kg at bedtime (fast acting insulin)

Insulin Dose Calculation

Regimen (A or B): _____
Weight (kg): _____
Total daily insulin (total weight x units/kg): _____

Dose	Breakfast	Lunch	Dinner	Bedtime
(Dose agent)				

The browser's taskbar at the bottom shows several open applications, including "Clinfo...", "RE: 'dum...", "Inbox...", "RE: impe...", "COMPET...", "Physician...", "Vascular...", and "https://...". The system clock shows 7:29 PM.

Description of CCC

- 4 Clinical Care Coordinators (3 FTE)
 - 3 research nurses, 1 clinical pharmacist
 - 1 CCC per 15 practice sites (~200 patients each)
- Function as communication link between patients, physicians, and specialists to improve continuity of care
- Knowledgeable about clinical evidence supporting vascular management recommendations
- Expertise in Knowledge Translation

Role of CCC in supporting physicians with CDSS

- Trains physicians and office staff to use Vascular Tracker
- Ensures compliance with use of tracker
- Ensures that tracker data are kept up-to-date for each patient and that data inputted into tracker are of high quality
- Assists physicians to interpret tracker information and provides additional support for recommendations when needed
- Follows up with physicians to ensure that action is taken to address uncontrolled vascular risk factors, assisting physician to implement action plan when necessary

Role of CCC in supporting patients with CDSS

- Group education on vascular risks and management
- Goal-setting, development and implementation of action plans for behaviour change
- Assists patients to interpret and understand tracker information and encourages patient to discuss pertinent points with physician
- Encourages compliance with quarterly lab-work and physician visits
- Regular telephone follow-up with patients struggling to meet vascular targets to provide advice, support, and linkage to resources

CCC use of Vascular Tracker

- Uses the VT population view to sort patients based on whether or not they meet targets for each vascular monitoring variable
- Priority given to patients not meeting targets to offer group education sessions or hold disease management clinics

The screenshot shows the 'Vascular Tracker for COMPETE III' web application. The interface includes a navigation menu with 'Patient', 'Practice', and 'Resources' tabs. The 'Patient' tab is active, displaying a list of patients. A table of patient data is shown, with columns for Patient, FP visit date, A1c, Blood pressure, and LDL-cholesterol. A dropdown menu is open over the 'Patient' column, showing names like M.P., E.H., S.T., B.R., and C.W. The table data is as follows:

Patient	FP visit date	A1c	Blood pressure	LDL-cholesterol
PISTERS MATTHIAS J				
TIEFENBA SIEG	14-Oct-21	0.074 2005-Feb-09	Not available Not available	Not available Not available
HECKBERT EDV	5-Feb-21	Not available Not available	130/70 2004-Jul-06	2.57 2004-Oct-04
REIDER BE MAR	75-Apr-07	0.072 2005-Jan-25	118/75 2005-Apr-07	2.72 2004-Sep-03
WELLS CAROL D	75-Apr-08	Not available Not available	138/76 2005-Apr-08	Not available 2005-Mar-23

Data collection

- Clinical Care Coordinator documentation logs
- Chart and EHR audits
- Patient and physician end-of-study questionnaires and qualitative interviews

Outcome measures

- Workload measurements
 - Number (and types) of interactions with patients and physicians (phone, in-person, email)
 - Number and types of interventions made by CCC
 - Counseling (lifestyle, medication adherence)
 - Referral to community resources
 - Recommendations and advice to patients and physicians

Outcome measures

- Perceived usefulness of CCC
 - Patient and physician ratings of CCC's usefulness in helping them to use the vascular tracker and following best practices for vascular care
- Effectiveness of CCC at improving uptake of CDSS
 - Independent variable
 - Number and type of interactions with CCC
 - Dependent variables
 - Number of times vascular tracker used, adherence to best practices for vascular care (proportion of process measures that are assessed), proportion of vascular outcomes meeting targets
- Sustainability
 - Willingness to pay for CCC services

Analysis

- Types of CCC interactions
 - Means (SD) for continuous variables
 - Frequency/proportions for categorical variables
- Relationship between CCC interventions and uptake of CDSS
 - Pearson's correlation test for continuous variables
 - Spearman's Rank correlation test for ordinal variables
- Patient and physician perception of CCC
 - Qualitative analysis
 - Identification of main themes
- Sustainability
 - Conjoint analysis (patient & physician stated preferences)

Discussion

- Connecting human resources such as clinical care coordinators is important for the full success of CDSS in primary care
- CCCs play an important role in chronic disease management by addressing various components of the chronic care model (e.g. collaborative working relationships, clinical decision support, self-management support, referral to community resources)

Discussion

- CCCs may help overcome many of the barriers to uptake and acceptance of CDSS by ensuring that physicians and patients receive accurate, up-to-date information, relating this to evidence-based guidelines, and helping them to see how evidence can be meaningfully applied in practice
- Evaluation of the CCC role should include process measures (to determine the mechanism of effect within a complex intervention), outcome measures, acceptability and sustainability