

# Peripheral Arterial Disease: Application of the Chronic Care Model

Marge Lovell RN CCRC BEd MEd

London Health Sciences Centre

London, Ontario

# Objectives

- Provide brief overview of PAD
- Describe the Chronic Care Model & application of Chronic Care Model to PAD
- Discuss results of implementation of the Chronic Care Model in LHSC Vascular Risk Clinic
- Highlight Nursing role in Vascular Risk Clinic

# Peripheral Arterial Disease

- PAD is **common, chronic disease** and will become more common in the next 2 decades.
- PAD is associated with a marked increase in global cardiovascular health risks:
  - Heart attack, stroke, and death
  - Claudication and functional impairment
  - Gangrene and amputation
- The current knowledge base permits significantly better: prevention, early diagnosis, integrated treatment, and rehabilitation.
- Under diagnosed and under treated
- Lack of Awareness

# Background: Program Development

- Gap in care of vascular patient population identified
- Patients presenting with claudication & CLI, poorly medically managed
- Proposal to establish a multidisciplinary vascular disease risk clinic including vascular surgery, medicine and nursing
- Model of Care selected

# Risk Factor Modifications and Therapies That Improve Atherosclerosis

- Smoking cessation
- Lipid control
  - LDL  $\leq 2.0$  mmol/L
  - Raise HDL-C
  - Lower triglycerides
- BP control
  - Use ACE inhibitors or beta blockers
- Diabetes control
  - HbA<sub>1c</sub>  $\leq 7.0\%$
- Antiplatelet therapy
  - ASA, Plavix
- Achieving ideal body weight
- Exercise

# The practice of chronic care medicine requires a different approach

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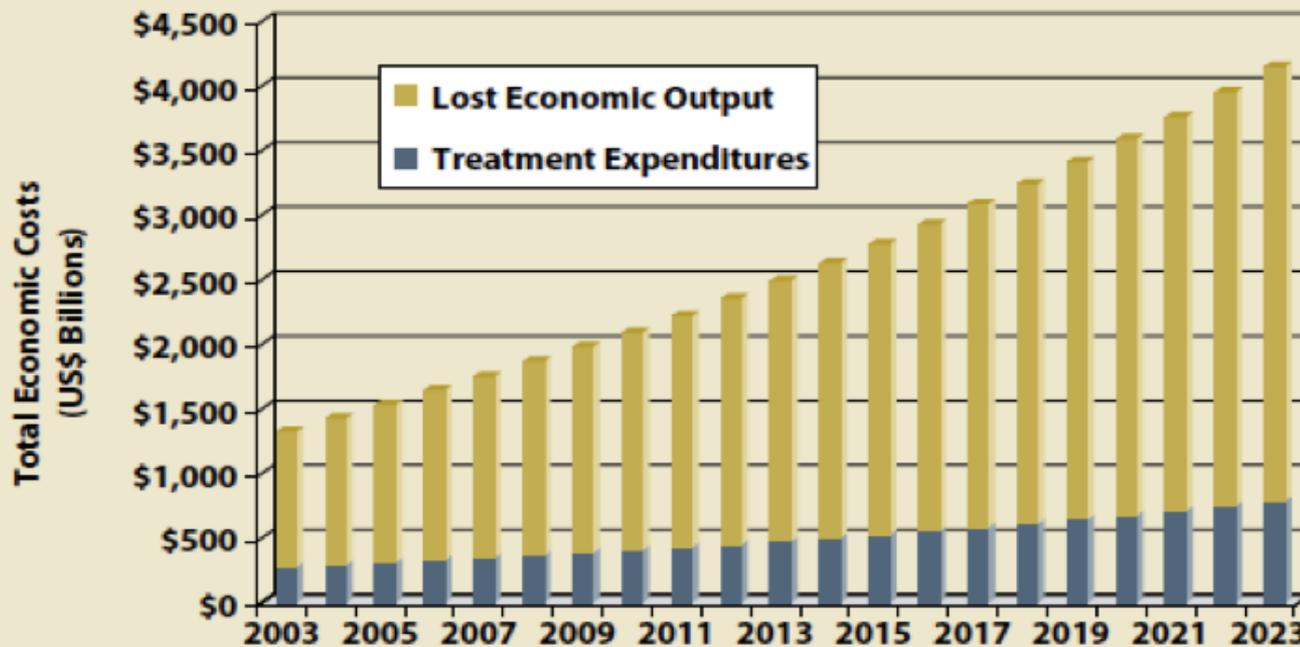
- The nature of care changes over time
- Must be managed over time as disease evolves with shifting severity, pace & treatments
- Good management is an unfolding process, best provided by a multi-disciplinary team of professionals
- Continuity & integration of care are essential

# Chronic Disease Numbers

- 125 million Americans currently suffer with a chronic illness – and by the year 2020, that number is expected to rise to 157 million.
- More than half of Canadians live with a chronic disease.
- Chronic diseases are expensive: they cost the economy 77 billion dollars – almost half of the annual cost of illness in Canada.

# Dollars spent: US

**Figure 8 :: Current Path, Combined Value of Treatment Expenditures and Productivity Losses, 2003–2023**



# The Role of the Patient

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- **Chronic disease dramatically transformed the role of the patient**
- **Chronic disease requires behavior change to forestall worsening of disease**
- **Patient lives with multiple consequences, including social & economic dislocation, emotional turmoil, financial fear, lowered self-esteem & depression**

# Model of Care Selected

- Chronic Care Model: (CCM)
- CCM Model developed by Wagner and his colleagues from MacColl Institute for Health Care Innovation with support from the Robert Wood Johnson Foundation in the mid 1990's
- Model applied with diabetes, geriatrics, asthma, CHF, and depression with over 200 health care organizations

# Chronic Care Model

- CCM is comprised of six interrelated components that promote high-quality health care for people living with chronic illnesses.
  - Health organization system
  - Self-management support
  - Team based delivery system design
  - Decision support with evidence based guidelines
  - Clinical information systems for data collection and follow up
  - Community

# The Chronic Care Model

Community

Resources and Policies

Health System

Health Care Organization

Family Education &  
Self-Management  
Support

Delivery  
System  
Design

Decision  
Support

Clinical  
Information  
Systems

Informed,  
Activated Patient

Supportive,  
Integrated  
Community

Productive Interactions

Prepared,  
Proactive  
Practice Team

Functional and Clinical Outcomes

# Chronic Care Model

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- LHSC identified gap in care of PAD patients
- Organization adopts performance improvement model
- Start up funding secured for program with an unrestricted educational grant from two pharmaceutical companies
- Members of the interdisciplinary team were chosen with roles identified (Surgeon, Nurse, Internal Medicine & Dietitian)
- Goals and objectives of program were established
- Equipment for clinic was purchased
- Dedicated clinic space was allocated

# Chronic Care Model

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Resources and Policies

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Systems

- Emphasize patient active role in goal setting
- Collaborative care planning/problem solving
- Ongoing educational process
- Graphs depicting their cholesterol levels, blood pressure, A1C levels and overall risk assessment score given to patients at each visit
- Written management plan with goal setting

# Chronic Care Model

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Resources and Policies

Family Education &  
Self-Management  
Support

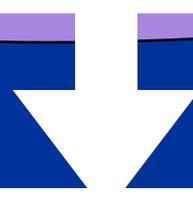
Health System

Health Care Organization

Delivery  
System  
Design

Decision  
Support

Clinical  
Information  
Systems



- Team roles and tasks (dedicated nurse for patients to contact)
- Dedicated health care professionals focusing on the needs of the individual patient.
- Regular follow-up care by Risk clinic

# Chronic Care Model

Community  
Resources and  
Policies

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**Decision  
Support**

Clinical  
Information  
Systems

- Evidence-based guidelines
- Provider education
- Scientifically developed educational materials from PAD Coalition
- Family Practice team ensures continuity
- Referrals and specialist expertise

# Chronic Care Model

## Community

Resources and Policies

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Support

## Health System

Health Care Organization

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System  
Design

Decision  
Support

**Clinical  
Information  
Systems**

- Registry to track clinically useful and timely information
- Registry reports/data for feedback
- Care reminders
- Assure timely planned follow-up
- Individual patient care planning (dietary, smoking cessation, exercise etc...)

# Chronic Care Model

**Community**

**Resources and Policies**

**Health System**

**Health Care Organization**

**Family Education &  
Self-Management  
Support**

**Delivery  
System  
Design**

**Decision  
Support**

**Clinical  
Information  
Systems**

- Sessions for the public on PAD are held annually.
- Educational sessions on how to perform diagnostic tests for PAD are held for health care professionals
- Area of improvement

# Nursing Role

- Clinic Organization
- Nurse managed
- Patient Education
- Patient follow up
- Patient contact person
- Patient empowerment

# Themes in the Chronic Care Model

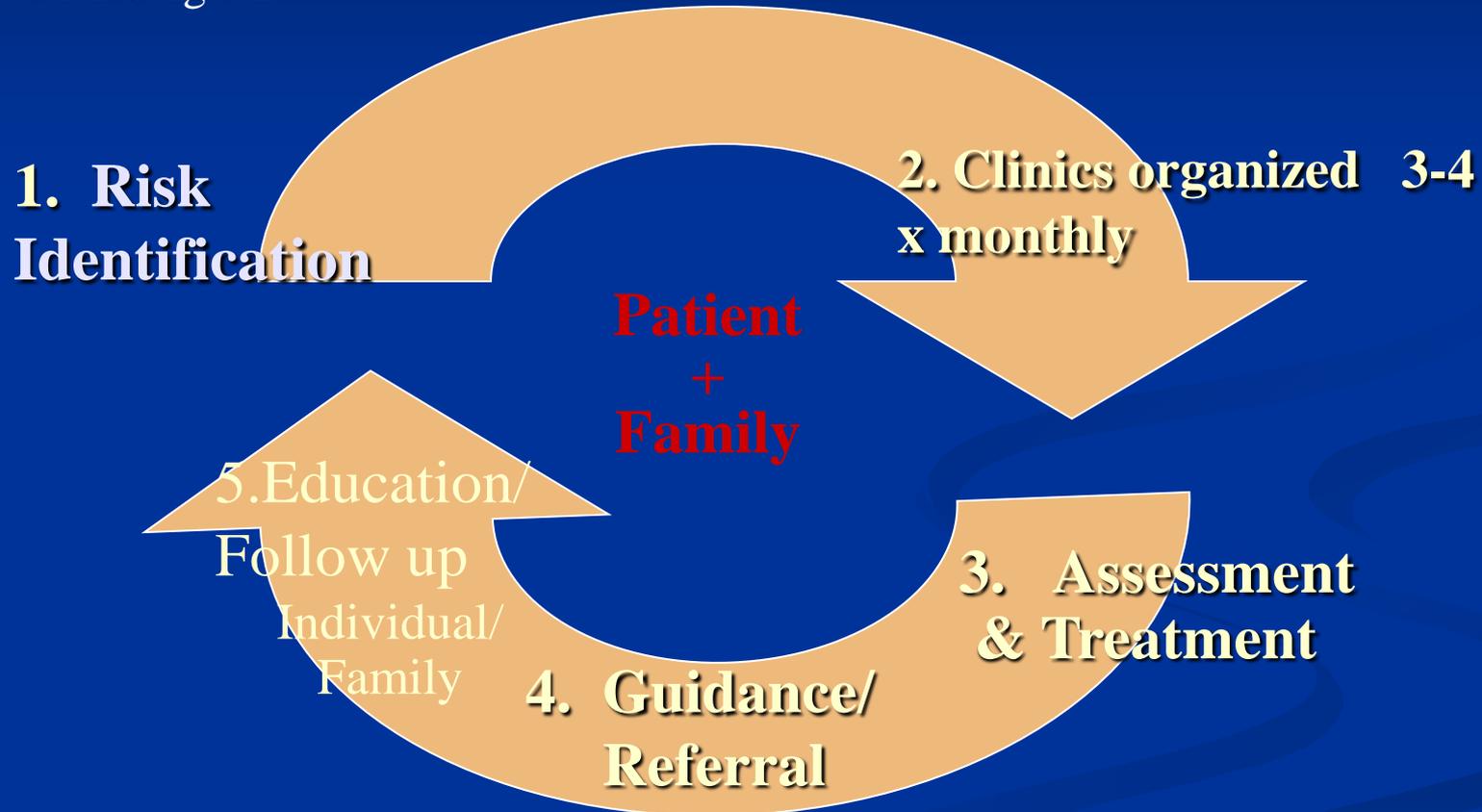
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- Evidence-based
  - Valuing excellence (and evidence) over autonomy
- Patient-centered
  - Each patient is the only patient
- Population-based

# Vascular Risk Reduction Clinic: Monitoring/Evaluation

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Vascular Surgeon



# Objective

- Determine if a multidisciplinary vascular disease risk reduction clinic with the aim of improving health outcomes for patients with peripheral arterial disease (PAD) and poorly-controlled risk factors was effective

# Methods

- Patients were referred from the vascular surgery service at our institution if they were deemed to be sub-optimally managed with regard to risk factor control.
- Interventions included optimization of medical therapy, investigations for undiagnosed PAD in additional vascular beds, access to smoking cessation therapy, dietary assessment and counselling, and active involvement of patients in evaluating progress towards their risk factor target goals.
- Assessment of risk factor control was done at each clinic visit and included measures of symptom severity, blood pressure, fasting blood sugar (FBS), lipid profile, BMI, and smoking status.

# Baseline patient characteristics

n= 103

Male:	61%
Female:	39%
Average age:	58 years
PAD, extremities:	95.2%
PAD, carotid:	19.4%
History of MI:	16.7%
Current smoking:	56.3%
Diabetes/IFG:	34%

*PAD: Peripheral Arterial Disease; MI: Myocardial infarction;  
IFG: Impaired fasting glucose*

## Comparison of Risk Factor Status

	Average value, at first visit (SD)	Average value, at last visit (SD)	Absolute reduction	Relative reduction	P (paired t-test)
BMI, kg/m <sup>2</sup>	27.6 (5.1)	27.9 (5.6)	-0.34 kg/m <sup>2</sup>	-1.2%	0.09
SBP, mmHg	143.3 (19.9)	137.3 (16.1)	5.8 mmHg	4.1%	<0.001
DBP, mmHg	79.7 (10.9)	75.8 (10.3)	3.8 mmHg	4.8%	<0.001
MAP, mmHg	100.8 (11.7)	96.3 (10.3)	4.5 mmHg	4.5%	<0.001
LDL	111.8 mg/dL (40.6)	83.1 mg/dL (25.9)	28.2 mg/dL	25.6%	<0.001
HDL	44.5 mg/dL (13.5)	42.5 mg/dL (13.5)	2.32 mg/dL	5.1%	0.0057
Total cholesterol	189.5 mg/dL (42.5)	154.7 mg/dL (30.9)	36.3 mg/dL	19.2%	<0.001
TC/HDL	4.6 (1.5)	4.0 (0.8)	0.6	13.0%	0.001
Triglycerides	185.1 mg/dL (151.5)	162.1 mg/dL (115.1)	23.1 mg/dL	12.5%	0.07
FBG	112.7 mg/dL (33.1)	110.3 (20.3)	2.16 mg/dL	2.0%	0.44

*BMI: Body mass index; SBP: Systolic blood pressure; DBP: Diastolic blood pressure; MAP: Mean arterial pressure; LDL: Low-density lipoprotein; HDL: High-density lipoprotein; TC/HDL: Total cholesterol to HDL ratio; FBG: Fasting blood glucose*

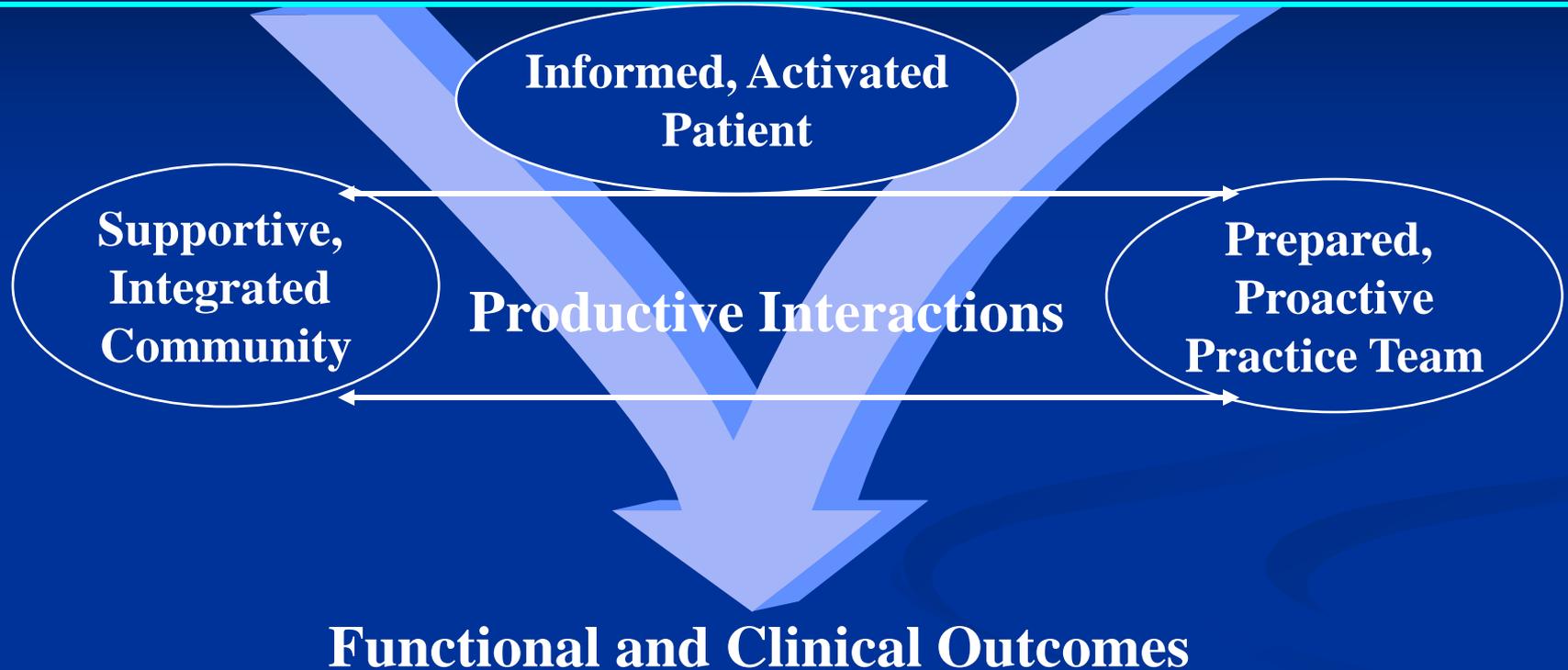
# Results

- Assessment of risk factor control was done at each clinic visit and included measures of symptom severity, blood pressure, fasting blood sugar (FBS), lipid profile, BMI, and smoking status.
- Analysis of risk factor status was performed for the first 103 patients followed in the clinic. Average follow-up time was 528 days, and statistically significant improvements were seen in blood pressure, LDL, HDL, total cholesterol (TC), and TC/HDL ratio, while BMI, FBS, and triglycerides remained stable.
- 9 of the 58 patients (16%) quit smoking

# Study Limitations

- Selection of high risk PAD population with poorly controlled risk factors
- Need to compare with another group for outcomes
- Examine our low smoking cessation rate & consider more aggressive counseling

# Chronic Care Model



**Satisfaction • Clinical Measures • Cost • Improved Care**

# Integrating the Chronic Care Model into PAD

## Health System Organization

Leadership committed to quality aligned care with 2 medical internists

### Self-Management Support

Skilled vascular nurses  
Psycho-social support nurse & dietician

Funding secure 2 Pharma companies

### Delivery System Design

Lines of communication  
Tracking system

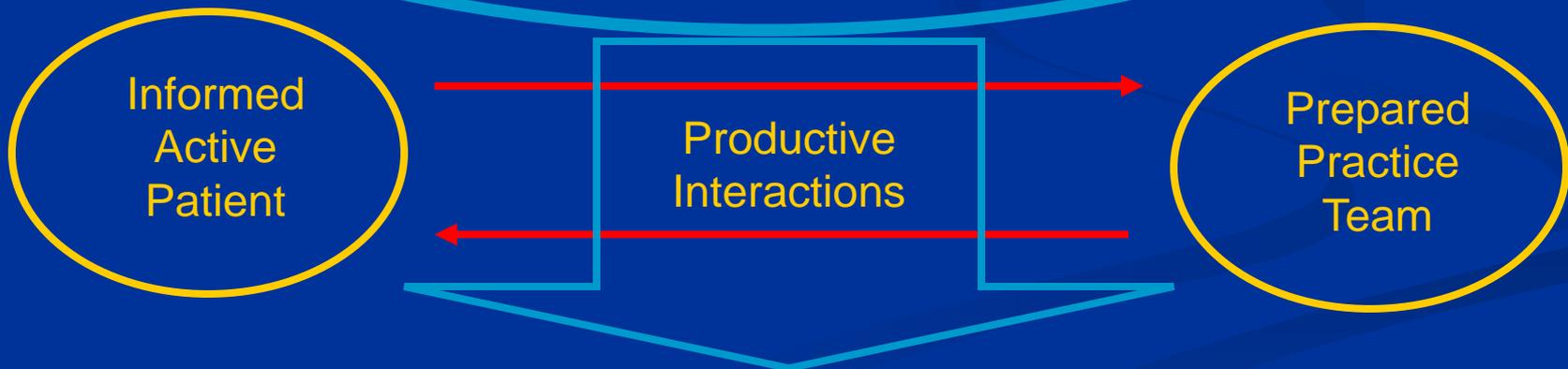
### Decision Support

CME, Guidelines  
Consultation, Feed back

### Information Systems

Registries  
Clinical Data  
Reminders  
Evaluation

+ links to community resources



# Conclusions

- Participation in a specialized vascular risk reduction clinic resulted in significant improvement in risk factors for disease progression compared to baseline status as managed in the community.
- Interdisciplinary approach utilizing the chronic care model effective for PAD
- Patients follow advice well with medications compliance; however, behaviour changes are difficult with episodes of relapse
- Nursing involvement is empowering the patient to make life changing choices can improve patient outcomes.