

Innovations in Diabetes Care

IHS Best Practices

Diabetic Foot Care Module

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Protecting the Diabetic Foot

A Strategy for Primary Care Clinicians

- Screening for High Risk Patients
- Practical Interventions
- Implementation into Practice

Why is Foot Care Important for People with Diabetes?

- ~40% will develop peripheral neuropathy
- ~20% have an acute foot problem on foot exam
- ~15% will develop an ulceration (cost ~ \$13-30K each)
- 5-10% progress to amputation (cost ~\$50K/yr each)
- 43% with ulcer and 47% with amputation die in 5 yrs
- Most amputations can be prevented with resources currently available in primary care
- Most patients with diabetes get their care from primary care providers

Simple Criteria to Identify High Risk Feet in People with Diabetes

- Insensate to 10-gram monofilament
or Insensate to 128-Hz tuning fork
- foot deformity
- prior ulcer or amputation
- absent pulse or abnormal ABI pressure

Diabetes Care, 15:1386-89, 1992; N Eng J Med, 1995;322:269-70.

Diabetes Care, 31:1679-85, 2008; Diabetes Res Clin Pract, 70:8-12, 2005

Feet Can Last a Lifetime, NIH/NIDDK, 2002

Press perpendicular to point of bending, hold 1 second and release (Demonstrate on hand)

Patient Closes Eyes, and acknowledges sensation of pressure with a “yes”

Test Both Feet, 4 sites each: Great toe and 1st 3rd 5th metatarsal heads (not heel or dorsum)

Insensate in one or more area confers risk

Vibration Sensation testing

128 Hz tuning Fork

- tested over the tip of the great toe bilaterally
- An abnormal response can be defined as when the patient loses vibratory sensation and the examiner still perceives it while holding the fork on the tip of the either toe

Singh JAMA 293:217–228, 2005

Abbott, Diabet Med 19:377–384, 2002

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Evidence-Based Education and Treatment Objectives for All Patients with Diabetes

Low-Risk Feet

- Control glucose
- Control Blood Pressure
- Control Lipids
- Smoking Cessation

Dyck, 1999; Moss 1992; Moss 1999; Boyko 1999; Goldberg, 1998; Pyorala, 1997; UKPDS, 1998 Haire-Joshu, 1999

Evidenced-based Footcare Educational Objectives for Patients with Diabetes

High Risk Feet

- Daily washing and inspection
- Clear walking area of dangerous objects
- Appropriate footwear (selection, fitting & use)
- Use slippers indoors - No Barefoot
- Proper Nail and Callus Care (no bathroom surgery)
- Avoid Extreme Temperatures
- Avoid Soaking
- Report Problems Promptly (Infections, ulcers, cuts that do not heal)

Foot Wear and Prevention of Foot Lesions

- Reduced Peak Planter Pressures > 50%
- Reduced callus formation > 30%
- Ulcer recurrence rates reduced > 50%
- LEA rates reduced > 70%

Viswanathan Diabetes Care 2004;27:474-477

Chanteleau, Diabet Med 1994;11:114-6

Ashry, J Foot Ankle Surg 1997;36:268-71

Edmonds, Q J Med 1986;60:763-71

Footwear Selection

- **Normal feet: standard shoes**
- **Insensate feet : quality walking shoe or added depth shoe**
 - ✓ **adjustable upper**
 - ✓ **firm heel counter**
 - ✓ **padded insert and collar**
 - ✓ **broad sole with nominal lift**
- **Insensate feet + Minor deformity : added depth shoe + custom insert**
- **Major Deformities: custom molded shoes**

Fitting Shoes

- Select shoes that match the shape of the foot
- Measure both feet while standing
- Fit while wearing standard socks
- Fit largest foot
- 1 cm length between longest toe and shoe tip

Footwear Precautions

- Break-in:
 - start 1/2-hr on first day
 - then ↑ by 1/2-hr increments per day
 - inspect for redness after wearing
- Change shoes 1-2 x daily
- Check for foreign bodies
- Replace when worn out

Medicare Therapeutic Footwear Benefit

3 steps:

1. Physician Certification for Therapeutic Footwear (MD, DO)
2. Footwear Prescription (usually a Podiatrist)
3. Fitting and dispensing (usually a Pedorthist)

Routine Podiatry Care for People with Diabetes

Associated with:

Increased self-foot care knowledge and 30% reduction in callus *Ronnema Diabetes Care, 1997;20:1833-1837*

54% reduction in ulceration rates in case control study of 91 diabetic patients with a history of foot ulcers

Plank, Diabetes Care 2003;26:1691-1695

75% reduction in LEA rates in Medicare patients with diabetes and high-risk feet who received palliate podiatry foot care services *Sowell, J Am Podiatr Med Assoc 1999;89:312-7*

Lubricate Dry Skin

- Autonomic neuropathy contributes to dry skin
- Instructed Patients to apply a moisturizing lotion daily
- Oil or water based lotions are a matter of patient preference
- May need care giver to assist

Nail trimming: Normal Nails

- Use nail nippers, strait or curved.
- Good lighting, comfortable position, safety glasses
- Stabilize the toe with one hand, cut with the other
- Start at one edge and follow the curve.
- File any sharp edges with emery board

Nail trimming: Curved Nails

- Use nail nippers, strait
- Good lighting, comfortable position, safety glasses
- Start at one edge and follow the curve
- Avoid cutting into corners
- File any sharp edges with emery board

Nail trimming: Thick mycotic

- Tend to be very brittle
- Can use nail nippers or dremmel to trim off sharp edges
- Best to refer to a podiatrist or certified foot care nurse

Callus Debridement

- Good lighting, gloves, alcohol swab, and #15 disposable scalpel
- Wipe with alcohol swab, callus tissue will turn white
- Shave or pear down callus gradually
- Palpate intermittently to feel when you are close to pliable “normal” tissue, then stop.

Principles of Wound Care

- Assessing foot Wounds
- Classifying foot wounds
- Management of uncomplicated wounds
- Vascular Assessment
- When to refer

Assessing Foot Wounds

Begin by assessing the following criteria:

- Wound dimensions.
- Quality of the wound bed and edges.
- Surrounding erythema and cellulites.
- Penetration to deep structures (fascia, tendon, bone, FB)
- Lower extremity blood flow.
- Signs of systemic infection (Temperature, WBC)

Simple Classification Foot Wounds

Characteristic	Uncomplicated	Complicated
Wound Size	≤ 2 cm	> 2 cm
Deep space involved	No	Yes
Margin of erythema	≤ 2 cm	> 2 cm
Systemic Infection	No	Yes
Vascular insufficiency	No	Yes

Management Principles Uncomplicated Wounds

- ✓ Clean and moist environment:
 - Wound Debridment
 - Regular Dressing Changes
- ✓ Off loading
- ✓ Oral Antibiotics directed by culture
- ✓ Monitoring of size
- ✓ Outpatient management appropriate
- ✓ May need to hospitalize for off loading
- ✓ Limited use of adjunctive healing agents
- ✓ Control glucose

Management Principles Complicated Wounds

- ✓ Inpatient management appropriate initially
- ✓ Initial Surgical Wound Debridement
- ✓ Vascular Assessment and appropriate intervention
- ✓ Clean and moist environment:
 - Regular Dressing Changes
 - Consider Negative Pressure Wound Therapy
- ✓ Parental Antibiotics directed by culture
- ✓ Off loading
- ✓ Monitoring of size
- ✓ Consider use of adjunctive healing agents

Off loading with commercial healing shoes

Half-Shoes

~\$50-80

Removable
Cast Walkers

~\$150-500

70% patients did not increase activity and used device only 28% of time
30% patients record more activity, but only use device 60 % of time

Adjunctive Wound Healing Therapy

a rational approach

- Insure the basics first: clean wound, off loading, control infection, good nutrition, metabolic control, assess circulation.
- Monitor healing, if less than 50% reduction in size after 4 weeks, chances of healing < 10%. Consider adjunctive agents as resources permit. *Sheehan, Diabetes Care 2003;26:1879-1882; Margolis, Diabetes Care 26:1696-1700, 2003*
- Some adjunctive treatments require large capital expenditures. Resources may be better spent on a case manager which can improve all aspects of diabetic care.

Criteria for Vascular Evaluation in the Diabetic Foot

- Ulcer with clinical signs of ischemia
- Non-healing ulcer
- Rest pain
- Nocturnal pain
- Lifestyle limiting claudication

**Remove Shoes Every Visit
Inspect Feet for Acute problems**

No Ulcer

Ulcer

Annual Foot Exam

Test SWM, Inspect for Deformity,
Prior Ulcer or Amputation

Assess Ulcer

Debridement, Blood Count, Temperature,
Wound Culture, Assess Circulation

Low Risk

Normal Exam

High Risk

Abnormal Exam

Uncomplicated Ulcer

< 2 cm, no deep tissue
involved, no major infection
and Adequate circulation

Complicated Ulcer

>2 cm, deep tissue involved,
major infection or
inadequate circulation

Education and
Care Stressing:

Control Blood
Sugar and
Blood Pressure

Smoking
Cessation

Follow-up
yearly

Patient
Education

Protective Shoes
Podiatry Care

Plus measures
for low-risk
patients

Follow-up every
2-3 month

Outpatient Care

Weekly Debridement, Daily
Dressing Changes, Non-
Weight bearing, oral
antibiotics if limited infection

Weekly Visits until Healed,
then treat as High-Risk.
Failure to improve in 4 week,
treat as Complex ulcer

Hospital Care

Surgical Debridement,
Dressing Changes, IV
Antibiotics, Vascular
Assessment and Treatment

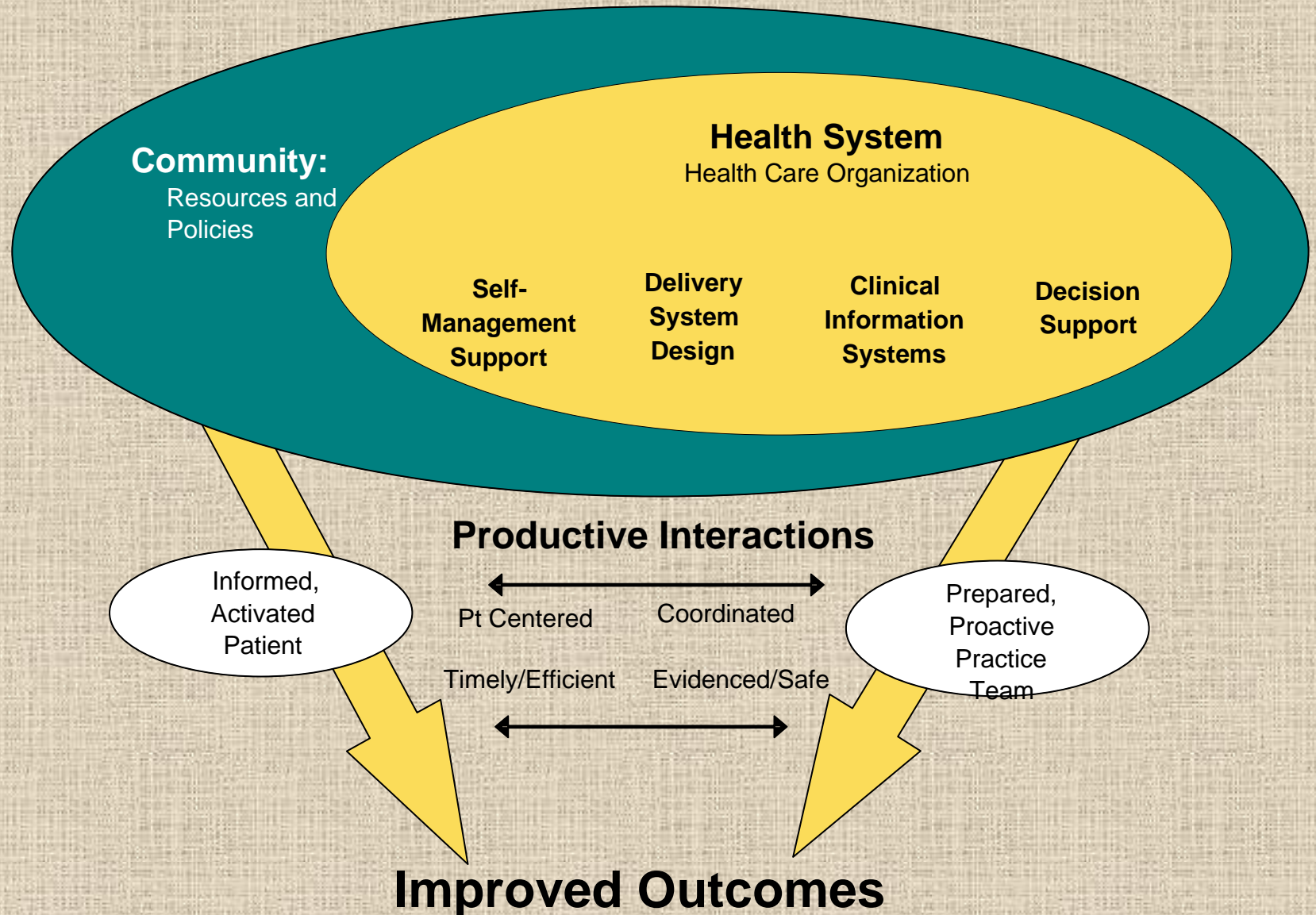
Daily Visits until Infection
Controlled, Circulation
Restored and or ulcer size
reduced, then treat as Simple
Ulcer.

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Improving Chronic Disease Care: The Chronic Care Model



Chronic Care Model - Diabetic Foot Care Best Practice

Health System Organization

Leadership committed to quality foot care and funded podiatry, foot care nurse, protective footwear

Self-Management Support

Risk appropriate Foot Care education

Delivery System Design

Foot Care Team

Foot Exams

Forms / Reminders

Decision Support

Training Guidelines Consultants

Information Systems

Diabetes Registry with Foot Risk Status

Patient Tracking Audits

+ links to community: footwear and surgery outreach clinics,

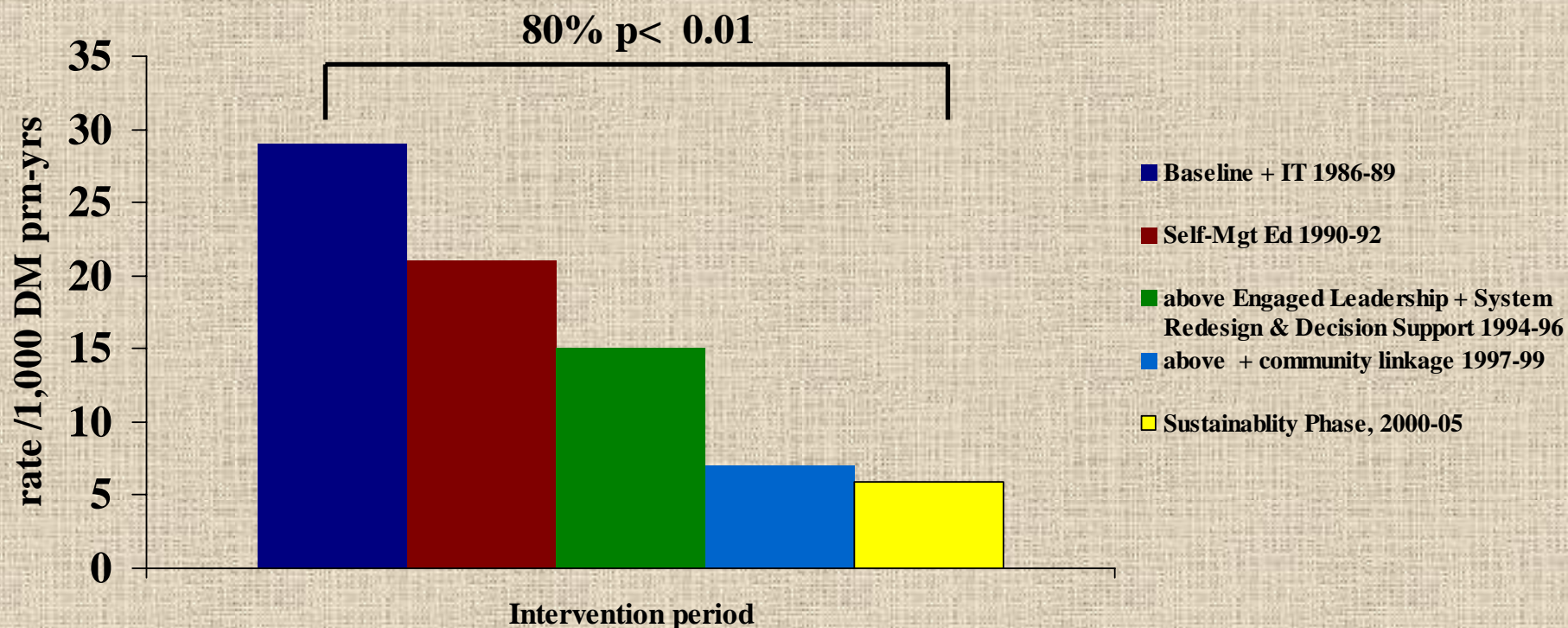
Informed Active Patient

Productive Interactions

Prepared Foot care Team

Fewer Foot Ulcers and Amputations

Average Annual Incidence Lower Extremity Amputations (LEA) among Diabetic Patients according to Chronic Care Model Intervention Period in an Indian Health Service Primary Care Setting



1986-1996: J Fam Pract 1998;47:128-132

1997-1999: Diabetes Care 2000;23:1445-46

2000-2005: Bemidji Area IHS Diabetes Program; CCM Interventions: Lancet 2005;366:1676-7

Stepped Approach for IHS “Best Practice” for Diabetic Foot Care

Comprehensive Program

Includes all of the previous elements plus ...

- ☑ footcare team
- ☑ Wound healing
- ☑ Outreach services
- ☑ track outcomes

Intermediate Program

Includes all of the previous elements plus...

- ☑ Footcare CPGs
- ☑ Podiatry and Footwear available
- ☑ Field Health trained
- ☑ Track care process

Basic Program

- ☑ DM Team adopts standards of care
- ☑ DM Registry
- ☑ Annual Foot screening
- ☑ Risk Appropriate Foot Education
- ☑ Podiatry, footwear & field health referrals
- ☑ Annual Diabetes Audit

Is Your Program Ready?

Do we have the following items in place?

- ☑ Perceived need by providers & community
- ☑ Administrative Support for CQI
- ☑ Functional IT support
- ☑ Access to Footcare services
- ☑ Functional Diabetes team

Selected Internet Resources for Diabetic Foot Care

IHS Best Practices – Foot Care

http://www.ihs.gov/MedicalPrograms/Diabetes/HomeDocs/Tools/BestPractices/bp06_FootCare.pdf

- Feet Can Last a Lifetime - NIH

<http://www.ndep.nih.gov/resources/feet/index.htm>

- Lower Extremity Amputation Prevention Program (LEAP) - HRSA

<http://bphc.hrsa.gov/leap/default.html>