



AMERICAN
PSYCHOLOGICAL
ASSOCIATION

Medical Regimen Adherence in the Management of Diabetes: What Psychologists Need to Know

Suzanne Bennett Johnson

Distinguished Research Professor

Florida State University College of Medicine

2012 President, American Psychological Association

Presentation Overview

- ▶ Increasing prevalence of diabetes and its consequences
- ▶ The daily management of diabetes; poor adherence is common and costly
- ▶ The role of the psychologists on the health care team
- ▶ Defining adherence
- ▶ Adherence and health status
- ▶ Provider adherence
- ▶ Adherence assessment
- ▶ Adherence intervention
- ▶ An ecological model for designing adherence interventions
- ▶ Recommendations for interested psychologists



Types of Diabetes

Type 1

- ▶ Usually diagnosed in childhood
- ▶ More common in Caucasians
- ▶ Requires daily insulin injections for survival
- ▶ No cure
- ▶ Cannot be prevented
- ▶ Less common

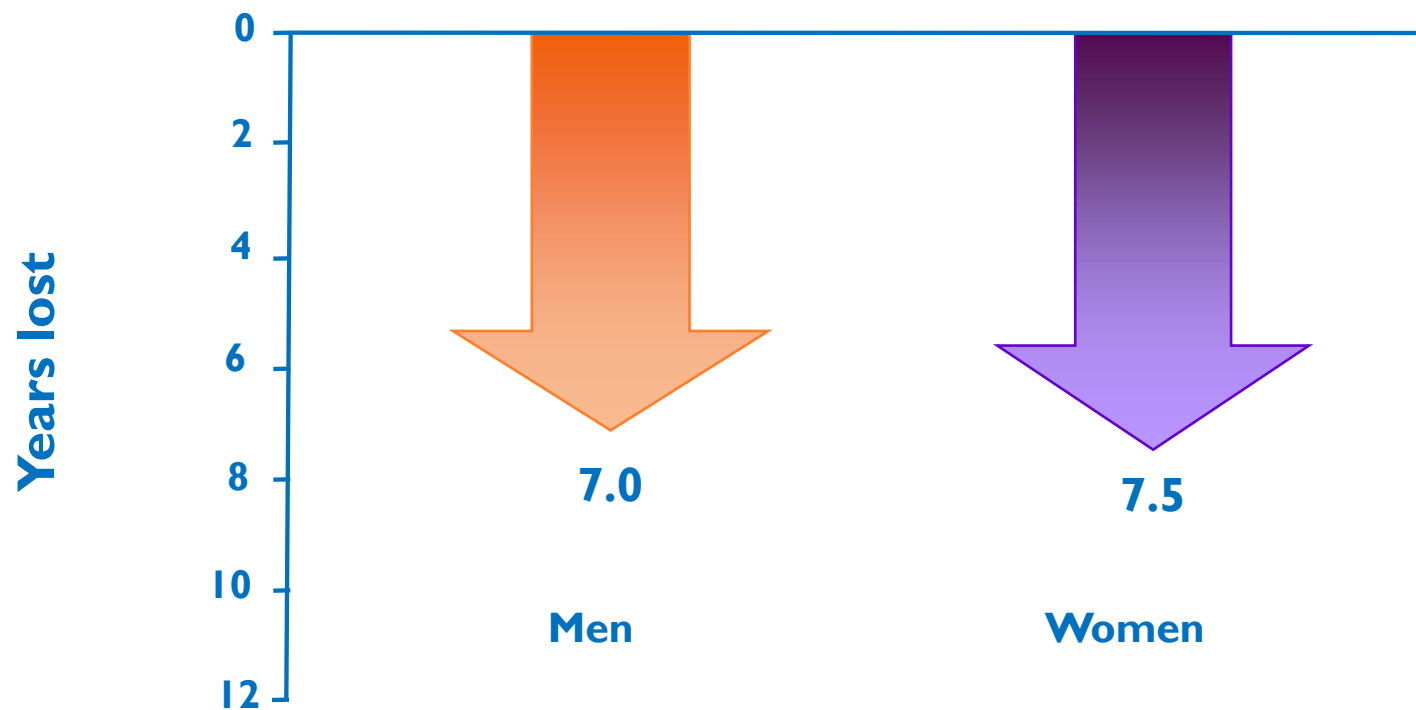
Type 2

- ▶ Usually diagnosed in older overweight adults
- ▶ More common in Blacks, Hispanics, Asians, Native Americans
- ▶ Some manage by diet and weight loss; most patients take oral meds; some take insulin
- ▶ Can be prevented
- ▶ More common

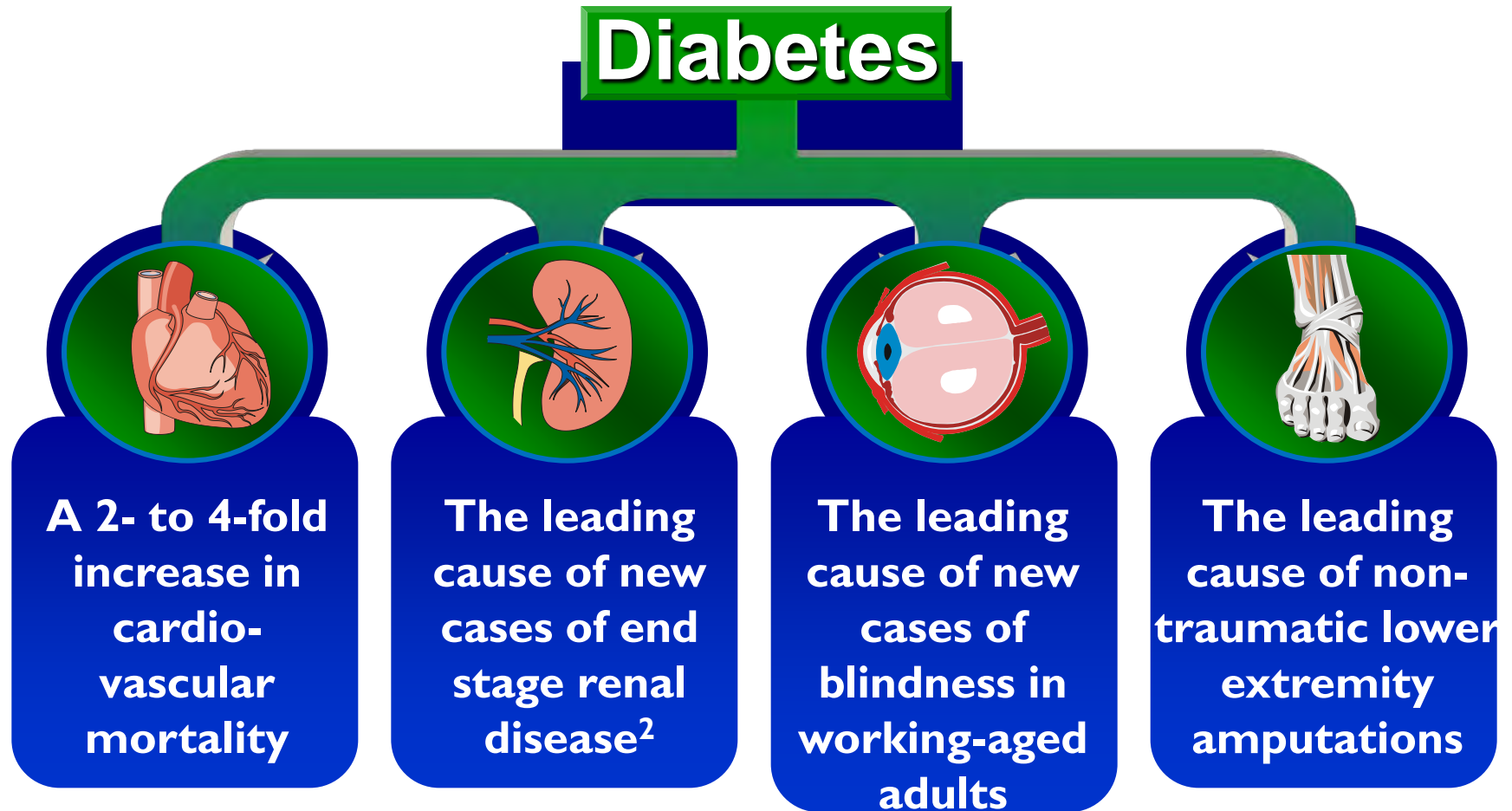


Diabetes Reduces a Patient's Lifespan

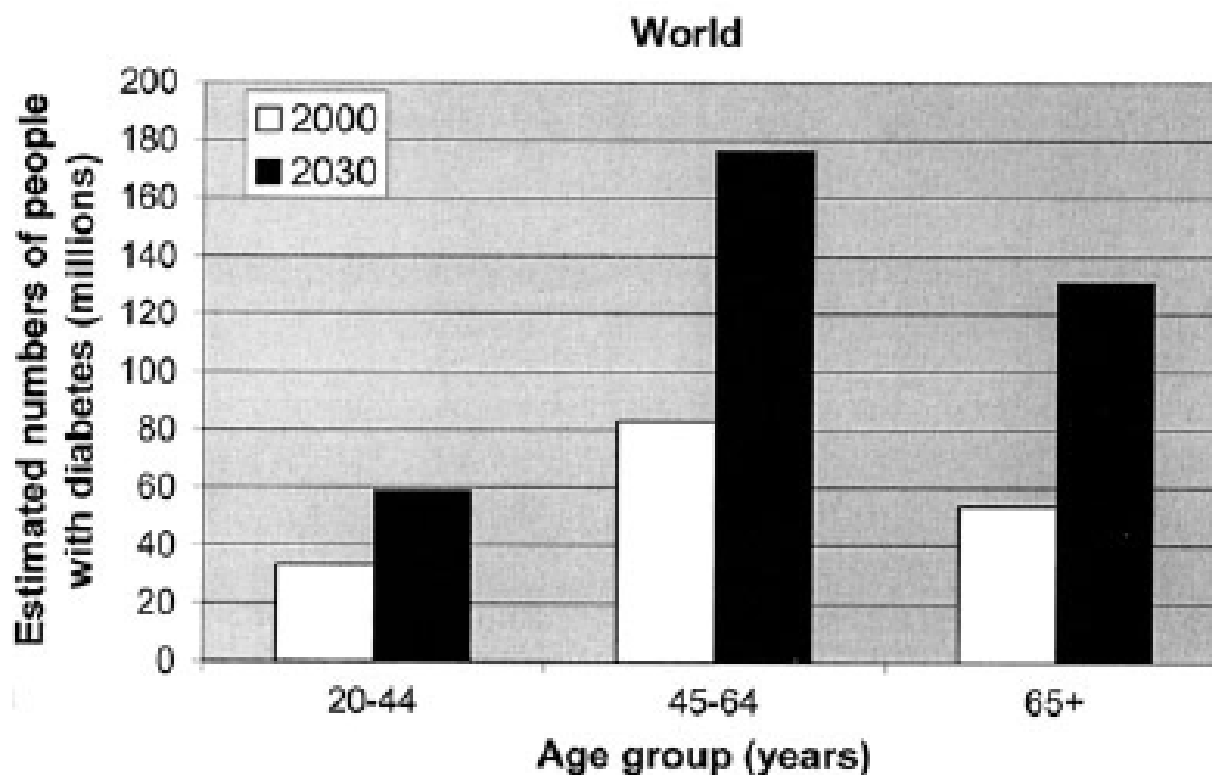
Average Years Lost for Diabetic Individuals Compared With Non-diabetic



Diabetes Leads to a Shorter Life and a Poor Quality of Life

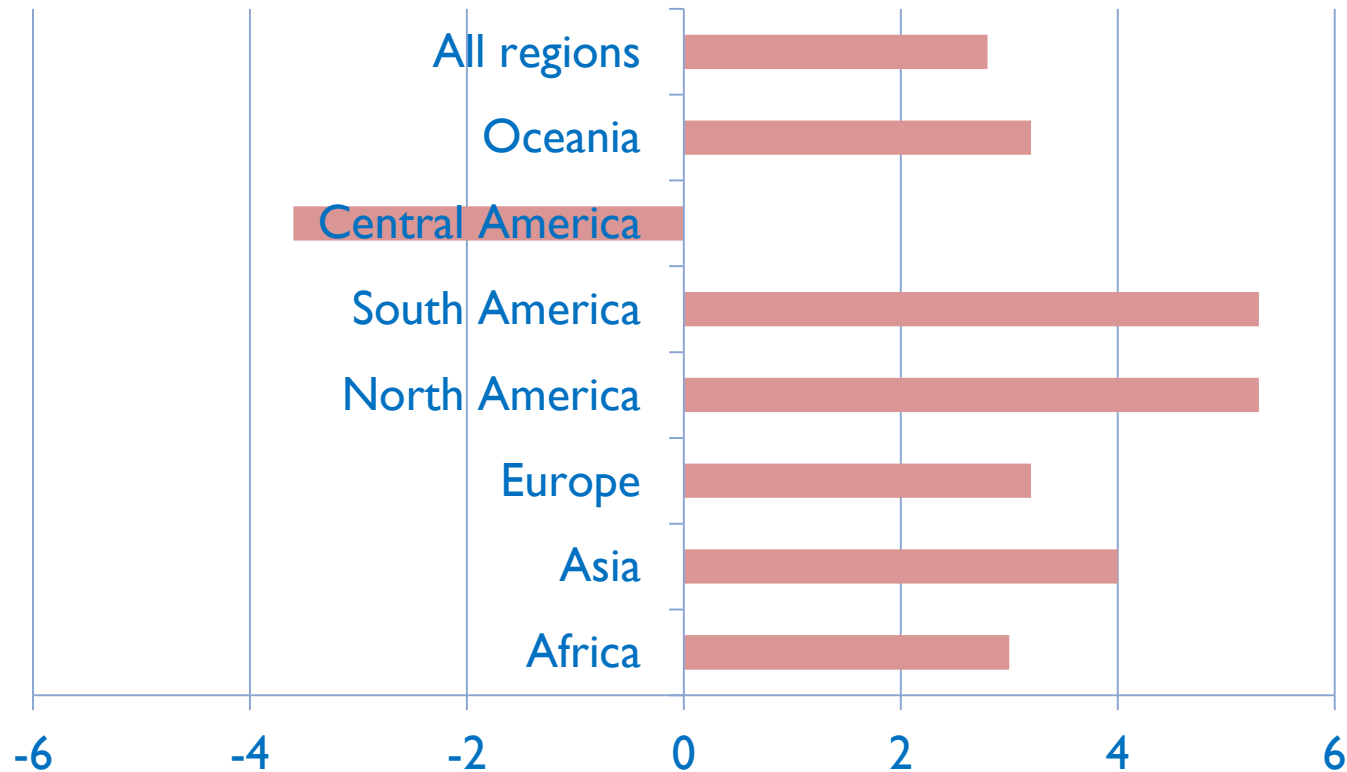


Diabetes in Adults is Increasing Worldwide



Diabetes in Children is Increasing Worldwide

Annual % Increase in Type I Diabetes 1990-1999



The DIAMOND Project Group. Diabetic Medicine 2006

Diabetes is Considered a Worldwide Epidemic

2000

- ▶ 2.8% of the world's population
- ▶ 171 million people

2030

- ▶ 4.4% of the world's population
- ▶ 366 million people

Wild et al. Diabetes Care 2004

Diabetes is a Complex Disease to Manage

▶ Medication

- ▶ Multiple daily insulin injections for type 1
- ▶ Daily oral medication or insulin injections for type 2

▶ Blood Glucose Testing

- ▶ ≥ 4 blood glucose tests per day for type 1

▶ Diet

- ▶ Food must be coordinated with insulin administration for type 1
- ▶ Weight loss particularly important for type 2

▶ Exercise: improves insulin action for both type 1 and 2

▶ Hypoglycemia: (very low blood glucose) can occur for patients taking insulin and must be recognized and treated

Diabetes Regimen Adherence is Poor

- ▶ Medication adherence ranges from 31-87% across studies in systematic reviews (Odegard & Cappadocia, The Diabetes Educator, 2007)
- ▶ Adherence to other aspects of the regimen – diet, exercise, blood glucose testing – is generally poorer than medication adherence (Johnson, Diabetes Care, 1992; Patton, J of the American Dietetic Assoc, 2011)
- ▶ Poor adherence is associated with higher health care costs (Breitscheidel et al. J of Med Economics 2010)

Psychologists can be an Important Member of the Diabetes Health Care Team

- ▶ Managing diabetes requires a complex set of patient behaviors every day; poor diabetes regimen adherence is common
- ▶ Psychologists are experts on human behavior and can address patients' difficulties adhering to the diabetes regimen
 - ▶ Adherence assessment
 - ▶ Adherence intervention
- ▶ Psychologists can also use their expertise to improve provider behavior and positively influence health systems to better promote adherence
- ▶ Psychologists can also play a role in preventing type 2 diabetes through lifestyle behavior change

Presentation Overview

- ▶ Increasing prevalence of diabetes and its consequences
- ▶ The daily management of diabetes; poor adherence is common and costly
- ▶ The role of the psychologists on the health care team
- ❖ **Defining adherence**
- ❖ **Adherence and health status**
- ❖ **Provider adherence**
- ▶ Adherence assessment
- ▶ Adherence intervention
- ▶ An ecological model for designing adherence interventions
- ▶ Recommendations for interested psychologists

Defining Adherence

“the extent to which a person’s behavior
(in terms of medications, following diets, or
executing lifestyle changes)

coincides with medical or health advice”

Haynes et al, 1979

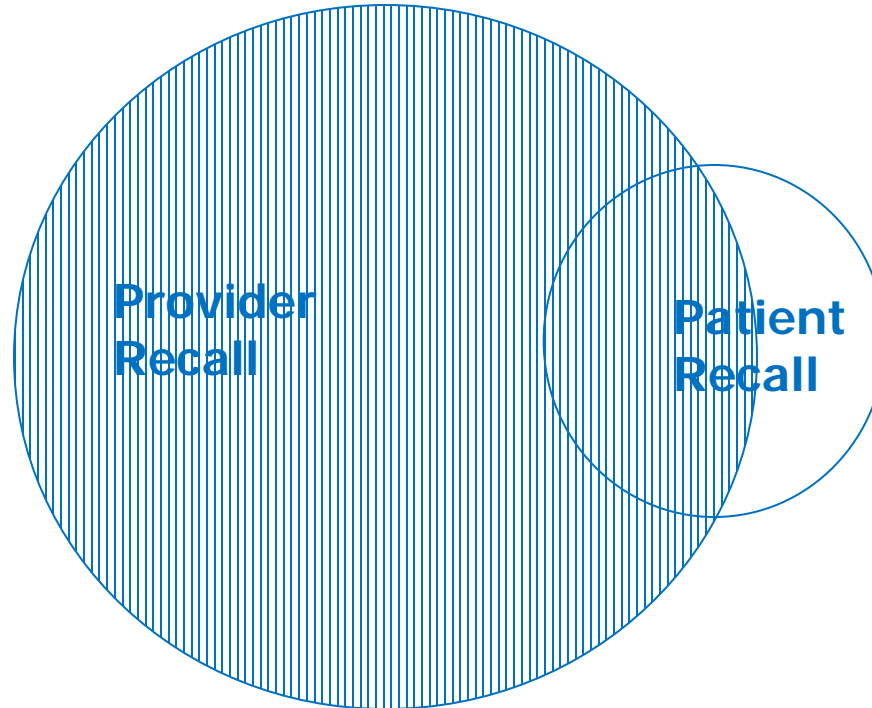
Health Advice – the Illusive Gold Standard

- ▶ Is the health advice communicated effectively to the patient?
- ▶ Is the health advice documented?
- ▶ Is the health advice given consistent with current standards of care?
- ▶ Would the health advice, if followed, actually make a difference in the patient's health status?



Is health advice communicated effectively to the patient?

Recall of recommendations by the health care team and by patients in a diabetes clinic. Adapted from Page et al (1981).





Is the health advice consistent with current standards of care?

Sequest et al 2005	Percent Physician Adherence
Annual cholesterol exam	58%
Biannual HA1C	57%
Annual dilated eye exam	17%
Statin use of LDL is ≥ 130 mg/dl	31%
Coon & Zulkoski 2002	
Annual cholesterol exam	61%
Biannual HA1C	60%
Annual dilated eye exam	12%
Weight and height at last visit	<30%
Blood pressure at last visit	>90%
Microalbumin-to-creatinine ratio	15%

Would the health advice, if followed, actually make a difference in the patient's health status?

It depends on the effectiveness of the treatment

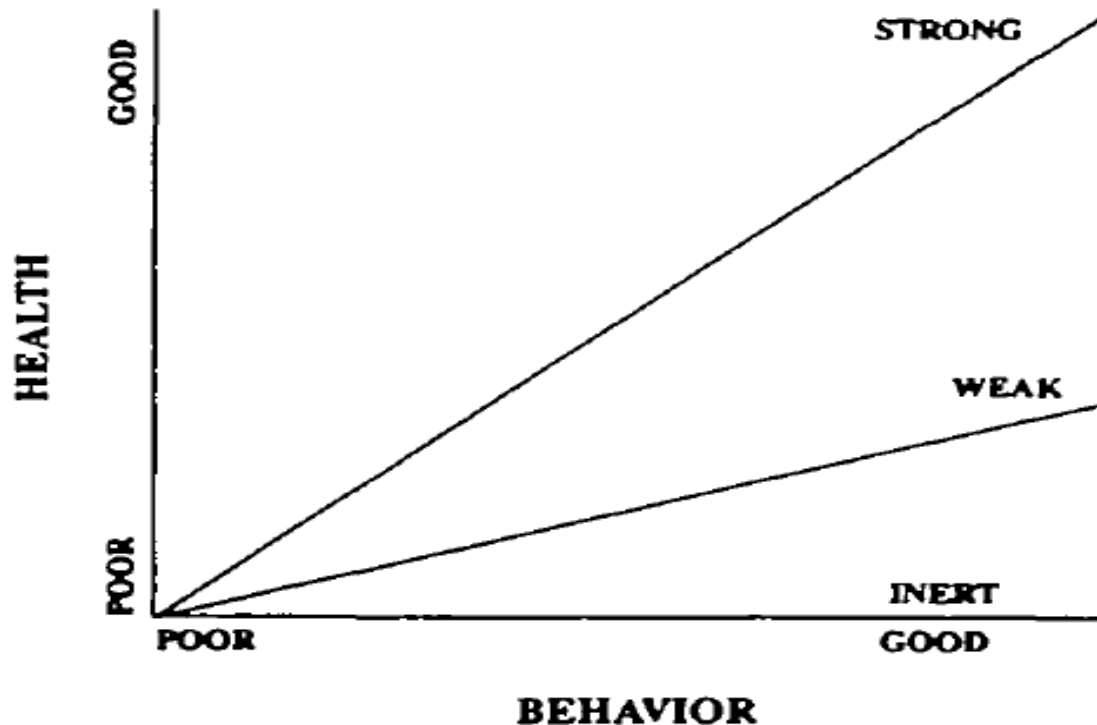


Fig. 4. The relationship between health behavior and health outcome as a function of inert, weak, and strong treatments.

Defining Adherence

“the extent to which a person’s behavior
(in terms of medications, following diets, or
executing lifestyle changes)

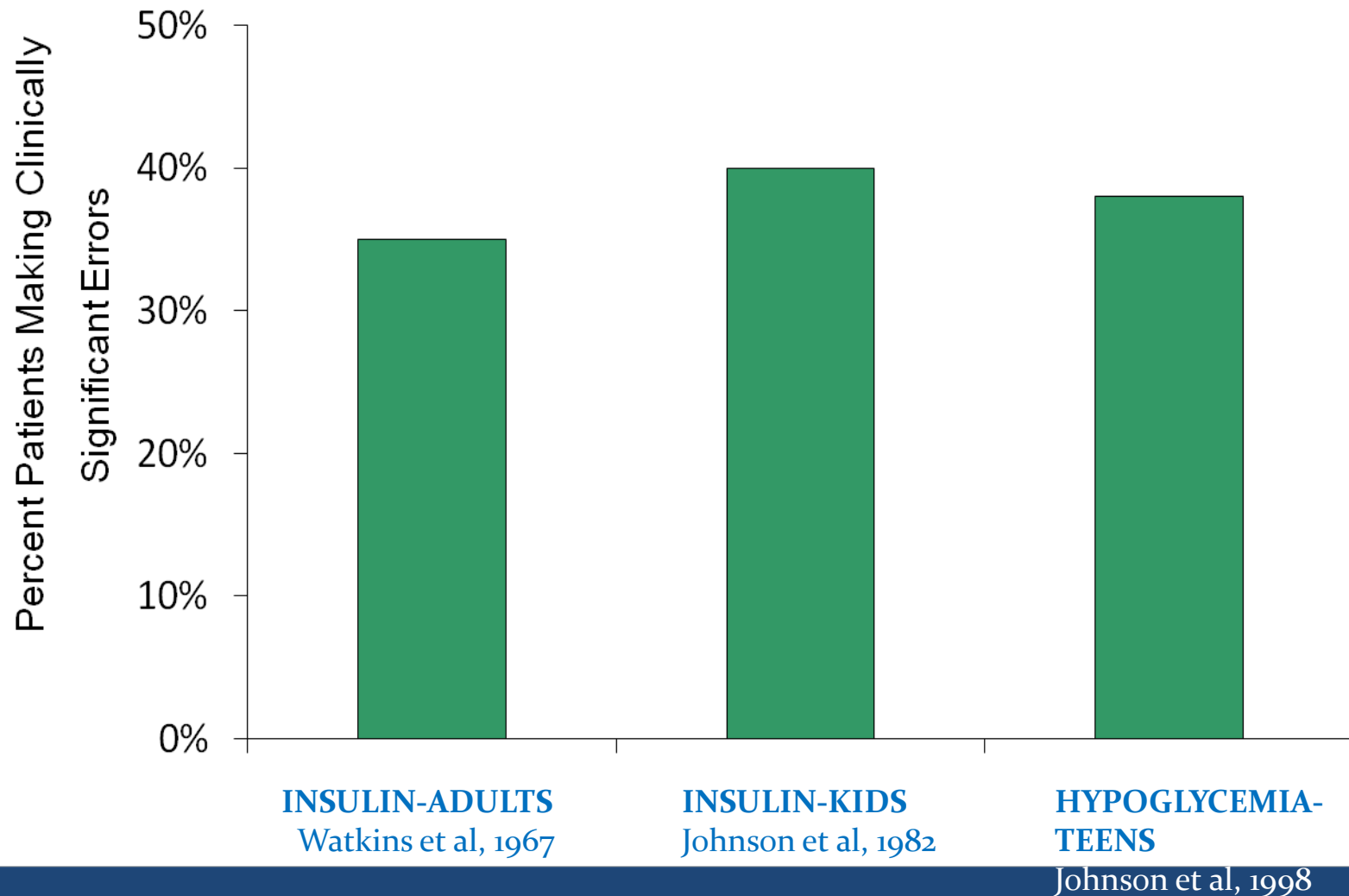
coincides with medical or health advice”

Haynes et al, 1979

Inadvertent versus Willful Nonadherence

- ▶ Inadvertent nonadherence: the patient fails to follow the prescribed health advice to due knowledge or skill deficits; the patient often believes he or she is adherent
- ▶ Willful nonadherence: the patient has the necessary knowledge and skills but knowingly fails to follow the prescribed health advice; the patient is usually aware that he is she is not adherent

Inadvertent nonadherence due to knowledge or skill deficits is common



Presentation Overview

- ▶ Increasing prevalence of diabetes and its consequences
- ▶ The daily management of diabetes; poor adherence is common and costly
- ▶ The role of the psychologists on the health care team
- ▶ Defining adherence
- ▶ Adherence and health status
- ▶ Provider adherence
- ❖ **Adherence assessment**
- ❖ **Adherence intervention**
- ❖ **An ecological model for designing adherence interventions**

Best Diabetes Adherence Assessment Tools

▶ Electronic monitors

- ▶ Blood glucose testing meters (date, time, blood glucose result)
- ▶ Medication Event Monitory Systems (MEMS) caps for oral medications (date, time)

▶ Questionnaires

- ▶ Self-Care Inventory
- ▶ Diabetes Regimen Adherence Questionnaire

▶ 24 hr Recall Interviews or Diaries

- ▶ Detailed information about multiple adherence behaviors

▶ ~~Glycosylated hemoglobin A1C (HA1C)~~

- ▶ HA1C is the gold standard measure of the patient's diabetes control; it is NOT recommended as an adherence measure



A Selective Comparison of Adherence Assessment Methods

Study	Population	Behavior	Self-Report	24 hr Recall Interview	Electronic Monitor	Pharmacy Refills
Ellis et al 2005	Type I Diabetes Adolescents	No. blood Glucose Tests/day		1.8 2.2 2.2 2.1	1.8 2.2 2.5 2.0	
Maikranz et al 2006	Pediatric Transplant Patients	% prescribed medication taken	97.5%		69.2%	
Modi et al 2006	Cystic Fibrosis Children	% prescribed medication taken	89.5%	27.4%	42.5%	46.4%
Johnson et al 2008	Type I Diabetes Children	No. blood Glucose Tests/day	5.8 6.0	4.5 4.5	4.6 4.6	



A Selective Comparison of Adherence Assessment Methods

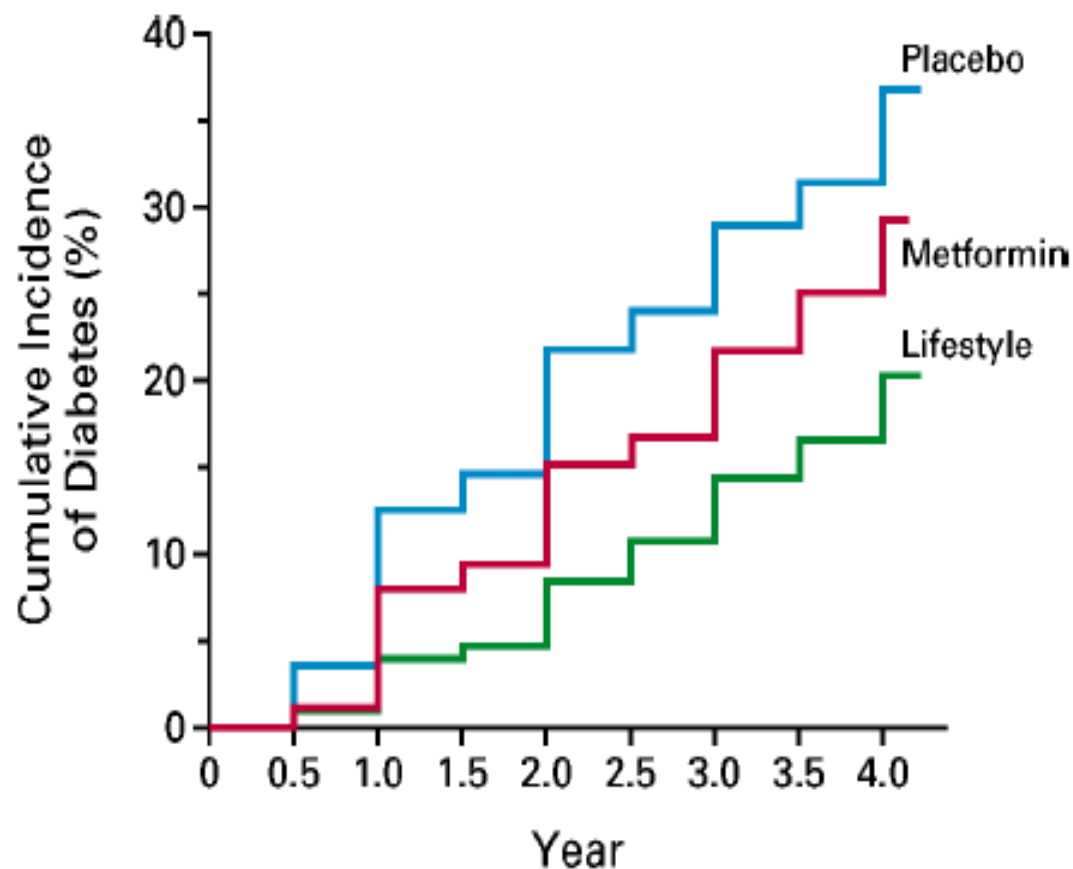
Study	Population	Behavior	24 hr Recall Interview	Direct Observation	
Reynolds et al 1990	Type I Diabetes Children	AM injection time PM injection time	7:28 17:35	7:41 17:48	
		Exercise frequency Exercise duration	3.0 47.2 min	3.6 45.7	
		No. of blood glucose tests	1.9	2.1	
		No. meals/snacks Calories consumed % Carbs % Fat Concentrated sweets	3.7 2336 36.4% 47.4 2.2	4.9 2979 35.4% 50.0% 3.4	

Best Adherence Interventions for Patients with Type 2 Diabetes

- ▶ Medication adherence can be improved by
 - ▶ Free or low cost
 - ▶ Reduce dose frequency
 - ▶ Reminders like blister packs
- ▶ Lifestyle Interventions & Self-management training
 - ▶ Lifestyle interventions – diet & exercise
 - ▶ Skills to improve glycemic control
 - ▶ Coping skills
- ▶ ~~Education alone not effective~~



Lifestyle Interventions Can Prevent Type 2: the Diabetes Prevention Program (DPP)



Best Adherence Interventions for Patients with Type 1 Diabetes

- ▶ Behavioral interventions
 - ▶ Behavioral methods
 - ▶ Parent training
 - ▶ Problem Solving
- ▶ Multicomponent interventions
 - ▶ Use of more than one intervention including family or behavioral interventions, and skills training
- ▶ ~~Education alone not effective~~

Best Strategies to Improve Provider Adherence

- ▶ System wide structures that enhance provider adherence to practice guidelines
 - ▶ Computerized tracking systems
 - ▶ Medical record audits and feedback
- ▶ Collaborative patient-provider approaches
 - ▶ Empower patients to ask questions
 - ▶ Provider- patient collaborative goal setting
- ▶ ~~Education alone not effective~~

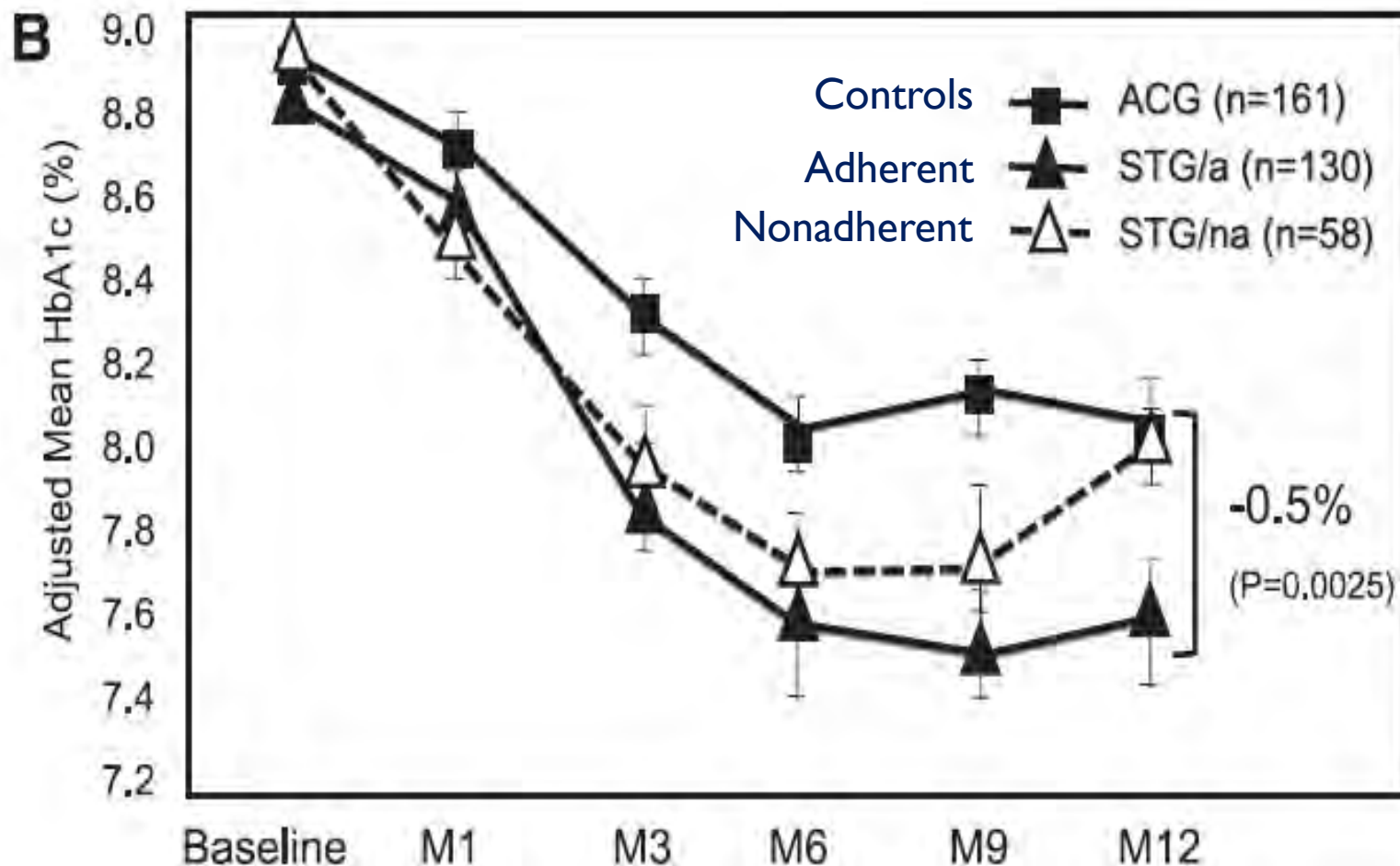
STeP Program: a Patient Provider Collaboration

- ▶ Patient records and plots 7 blood glucose test results at specified times for 3 days before the clinic visit
- ▶ Primary care physician uses these data and an evidence based algorithm to make changes to the patient's regimen
- ▶ This approach has resulted in changes in provider behavior and improved glycemic control for the participating patients
- ▶ Intervention materials available at www.behavioraldiabetes.org/studies/STeP-Study.html

STeP Program Effect on Provider Behavior

Provider Behavior	STeP Program	Controls
% of patients for whom a change in recommended treatment occurred the first visit	76%	28%
% of patients for whom insulin was recommended	42%	23%
Percent of visits where a change in recommended treatment occurred	54%	22%

STeP Program Effects on Patients' HAIC



An Ecological Model for Diabetes Care

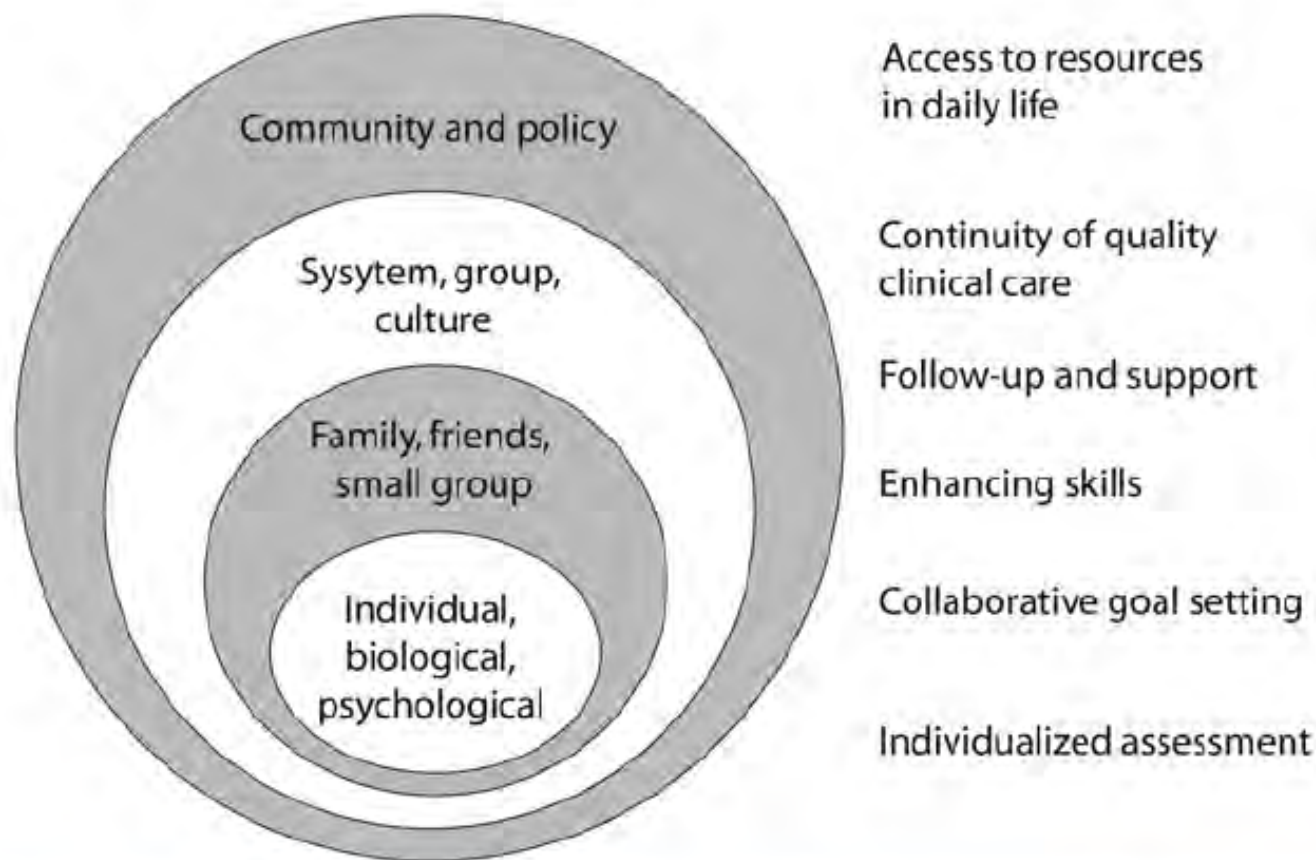


FIGURE 1—Correspondence of ecological levels of influence with resources and supports for self-management.

Recommendations for Interested Psychologists

- ▶ The prevalence of diabetes is increasing; currently considered an epidemic worldwide
- ▶ Provider & patient behavior critical to diabetes management
- ▶ Behavior is critical to the prevention of type 2 diabetes
- ▶ Psychologists are experts in human behavior and have much to offer in terms of treatment, prevention and research
- ▶ Evidenced-based adherence assessment tools are available
- ▶ Evidence-based adherence intervention strategies are available
- ▶ Use an ecological model when designing interventions
- ▶ Get involved! The health care system, science and patients need your expertise!

Presentation Overview

- ▶ Increasing prevalence of diabetes and its consequences
- ▶ The daily management of diabetes; poor adherence is common and costly
- ▶ The role of the psychologists on the health care team
- ▶ Defining adherence
- ▶ Adherence and health status
- ▶ Provider adherence
- ▶ Adherence assessment
- ▶ Adherence intervention
- ▶ An ecological model for designing adherence interventions
- ▶ Recommendations

Resources

- ▶ American Diabetes Association <http://www.diabetes.org/>
 - ▶ look for D. Young-Hyman and M. Peyrot. Psychosocial Clinical Guidelines for the Care of Patients with Diabetes. American Diabetes Association, Alexandria VA, expected publication: 2012
- ▶ National Institutes of Diabetes and Digestive Disease
<http://www2.niddk.nih.gov/>
- ▶ Centers for Disease Control and Prevention
<http://www.cdc.gov/DiseasesConditions/>
- ▶ World Health Organization
http://www.who.int/chp/chronic_disease_report/contents/en/index.html reports available in multiple languages