KADNE
대한당뇨병교육간호사회

대한당뇨병학회
Korean Diabetes Association

Health Outcomes and Measurement Methods of Diabetes Care

HeeSook Kim
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2012.11.09

동남보건대학교
DONGNAM HEALTH COLLEGE

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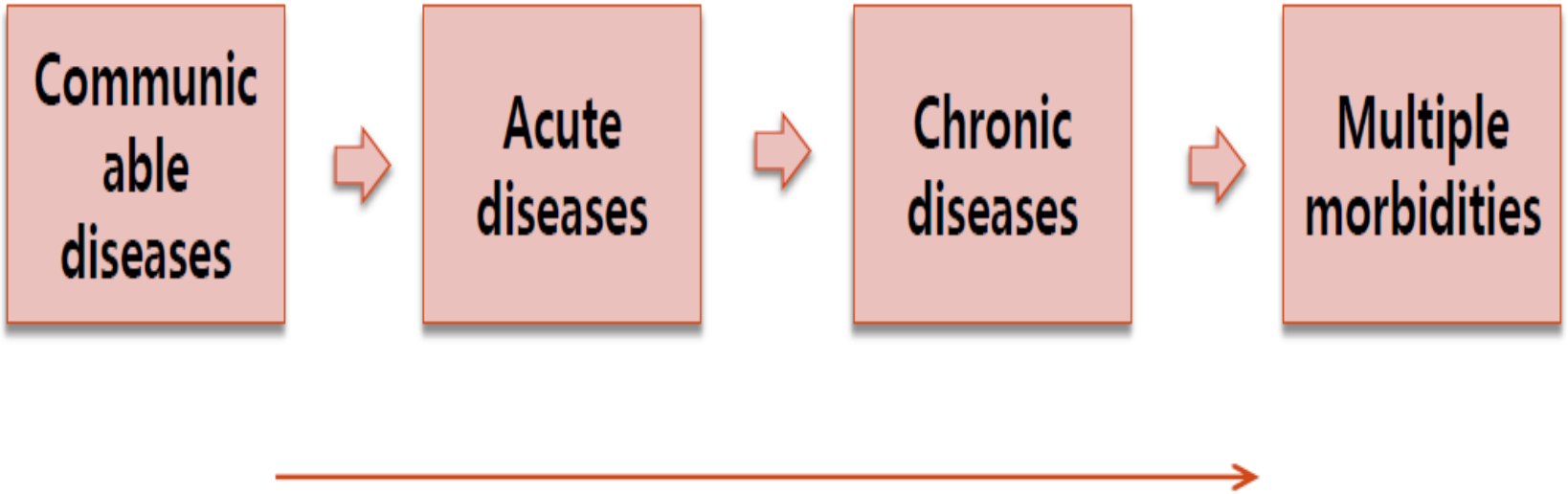
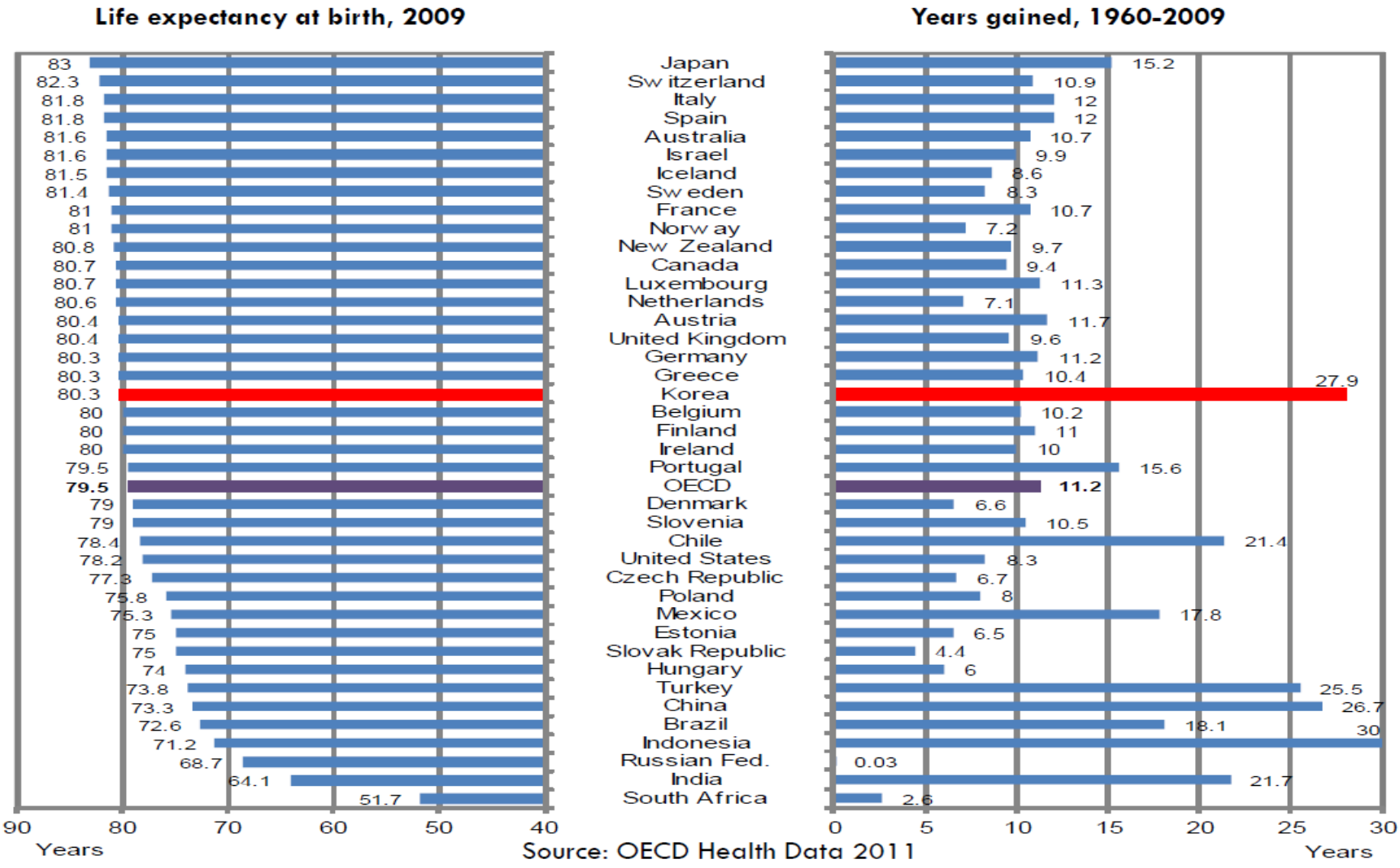
1. OECD Review of Health Care Quality : Korea

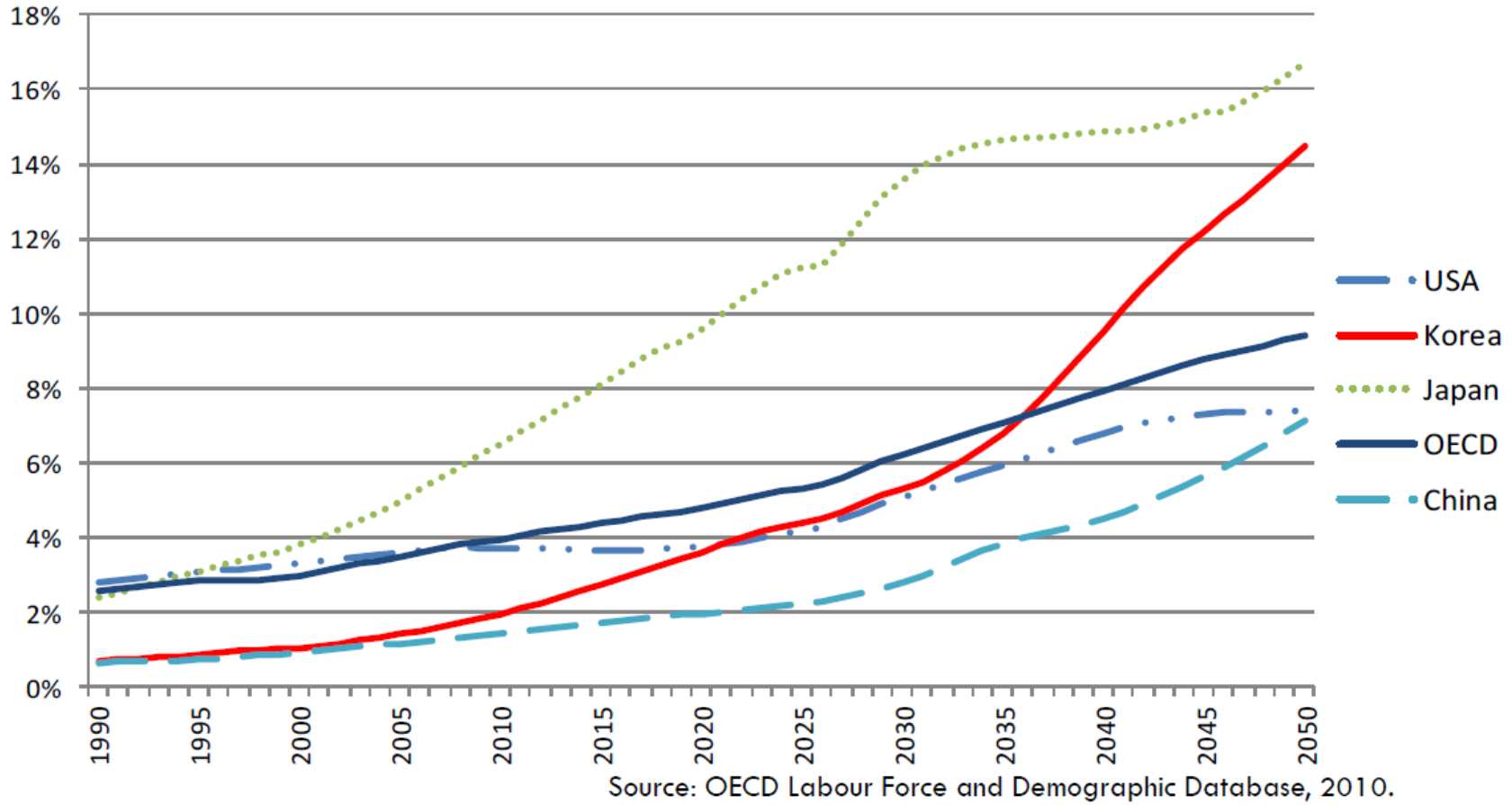
Change of disease epidemiology



Life expectancy at birth, 2009

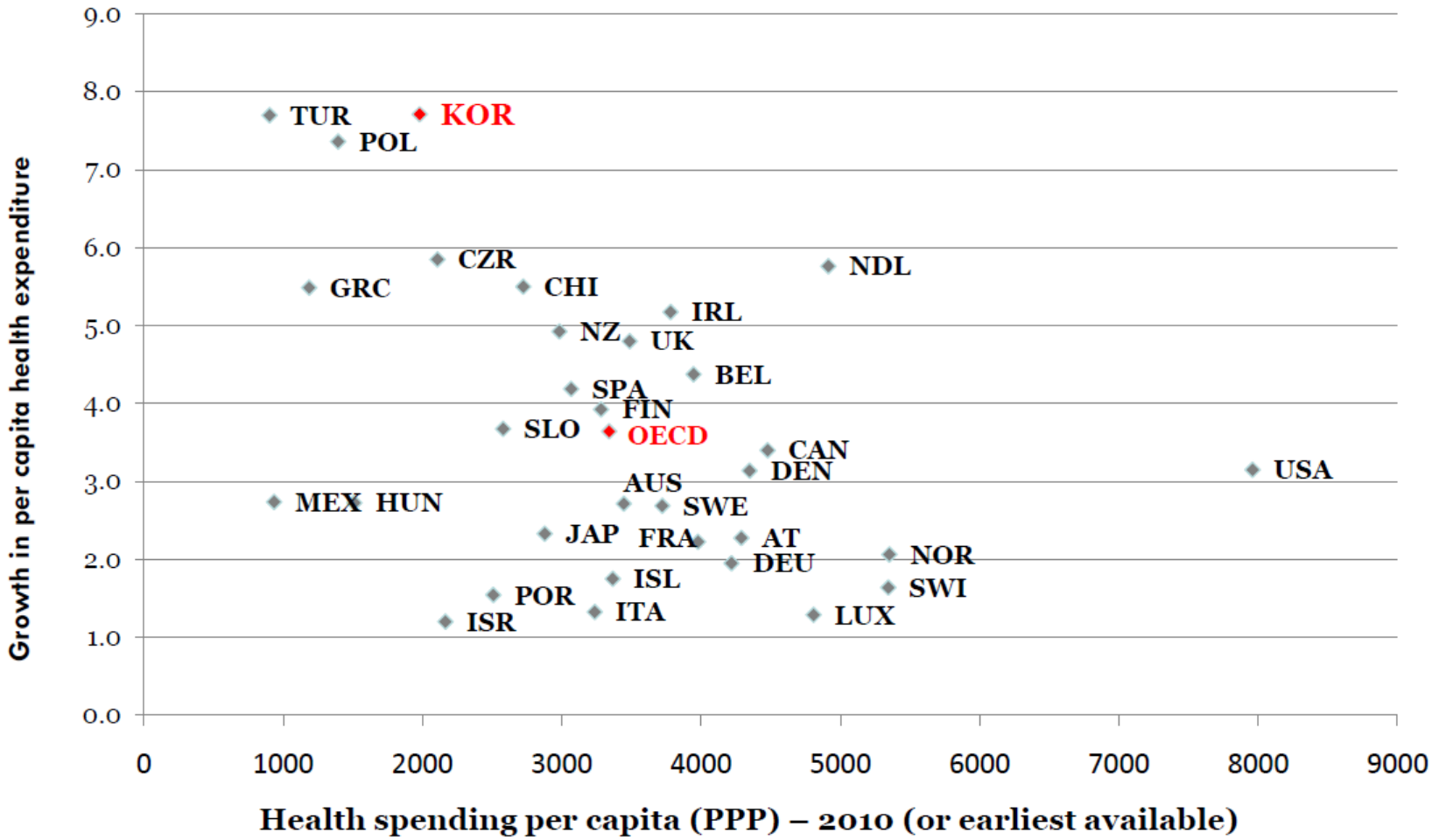


The share of the **population aged over 80years** old will increase rapidly



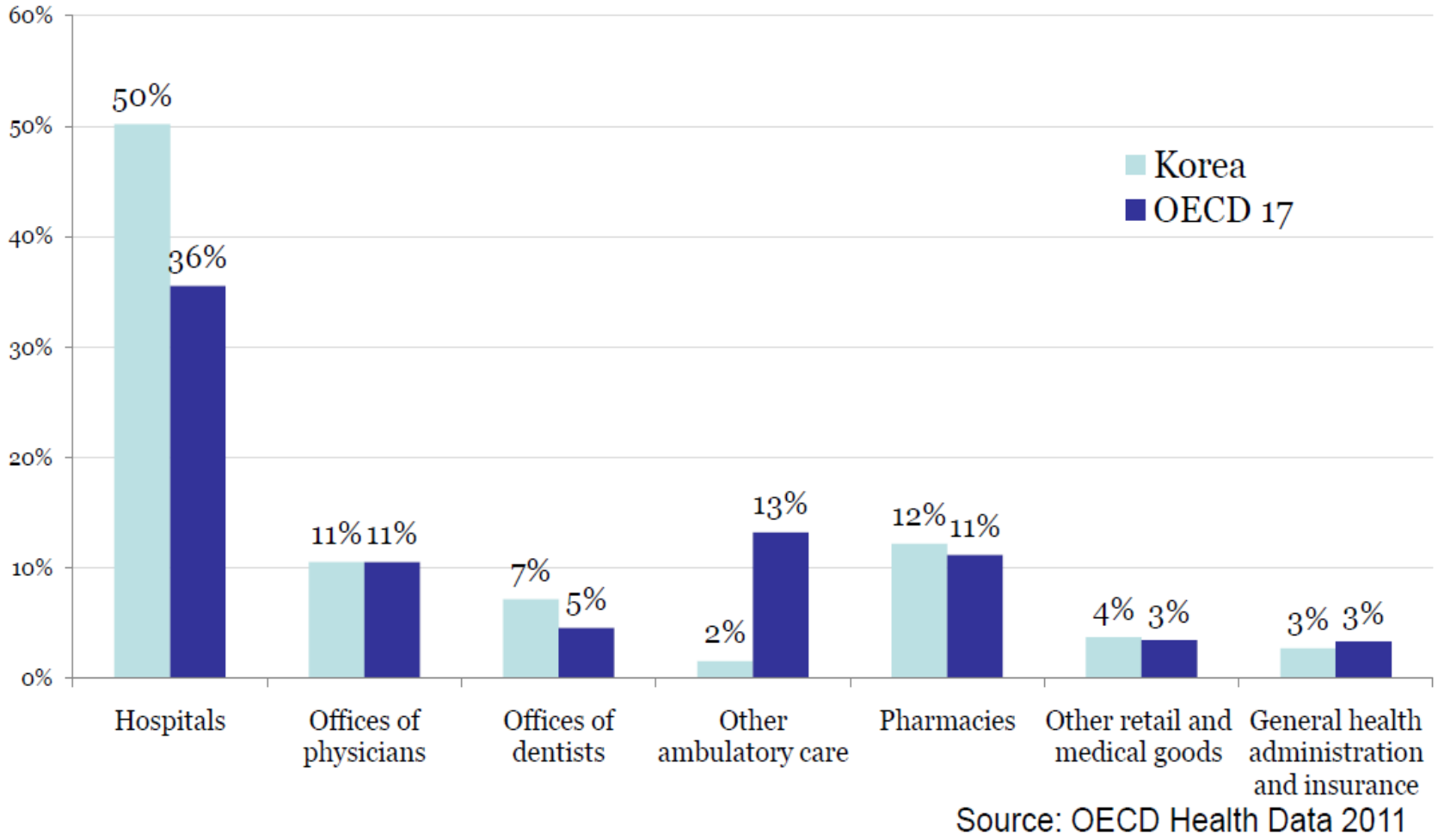
Source: OECD Labour Force and Demographic Database, 2010.

Health expenditure per capita across OECD countries & **growth** in per capita health expenditure (2002-2009)



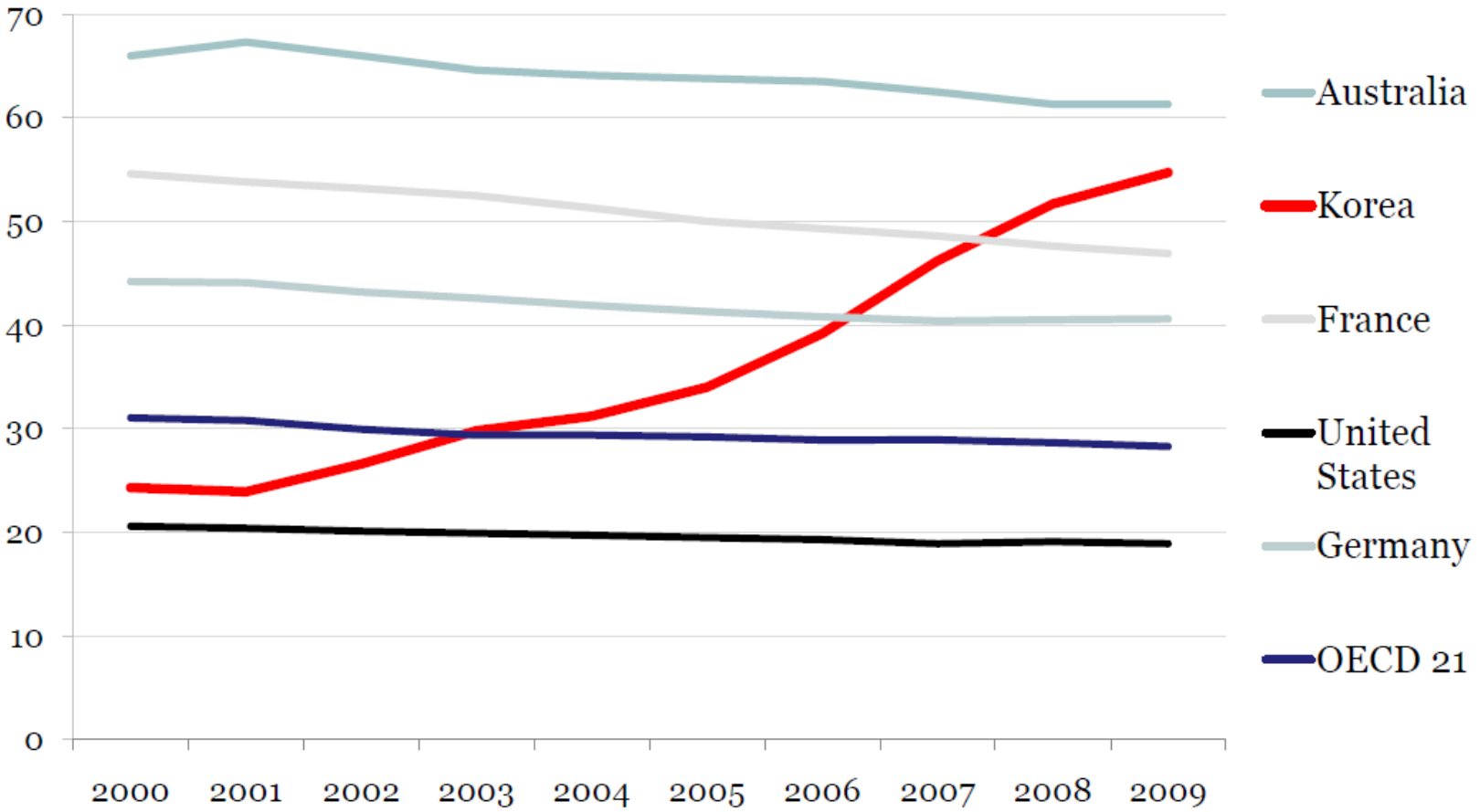
Source: OECD Health Data 2011

Major contributors to growth in health spending per capita (2004-2009)



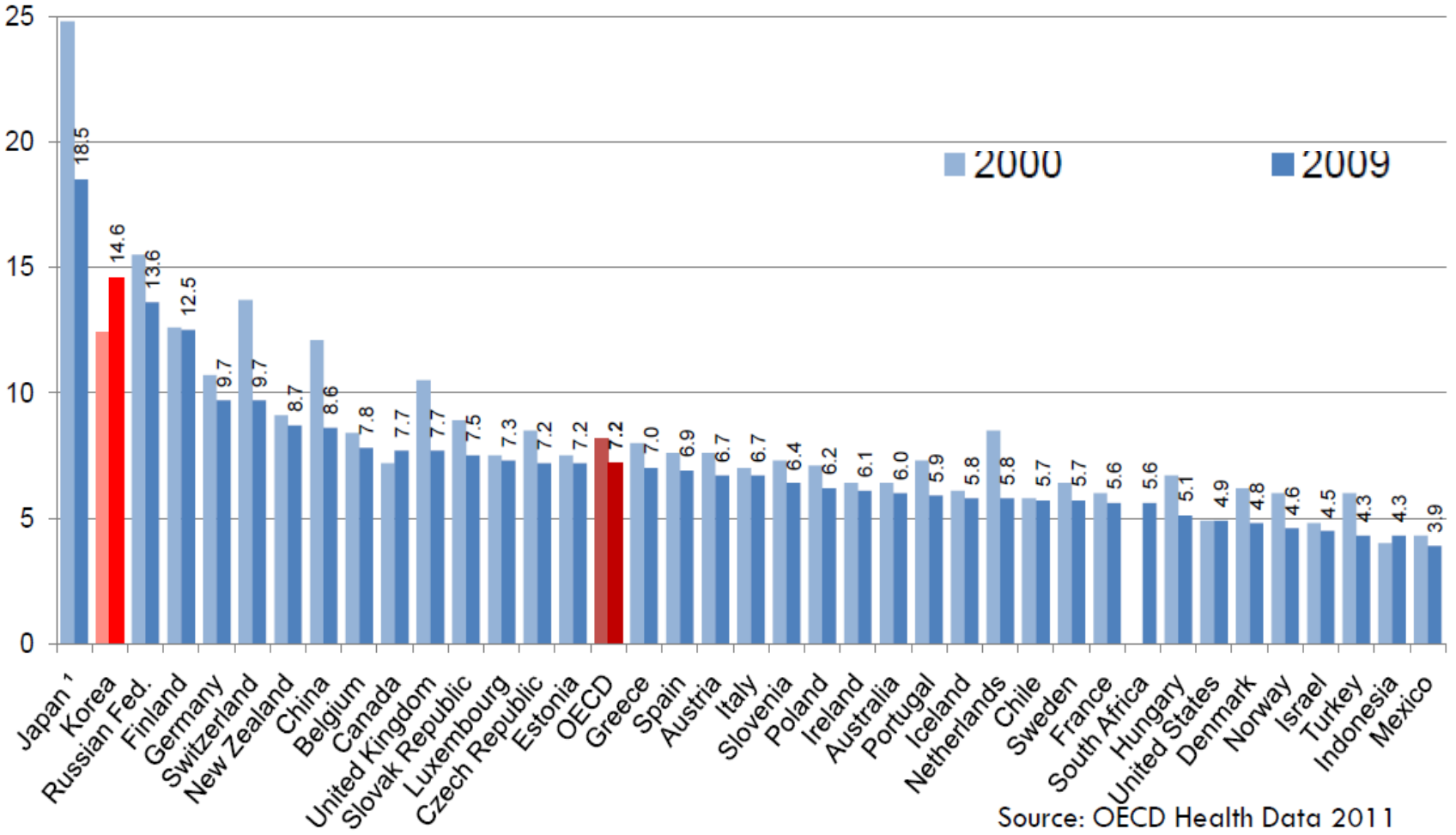
Source: OECD Health Data 2011

Hospitals per million persons (2000-2009)

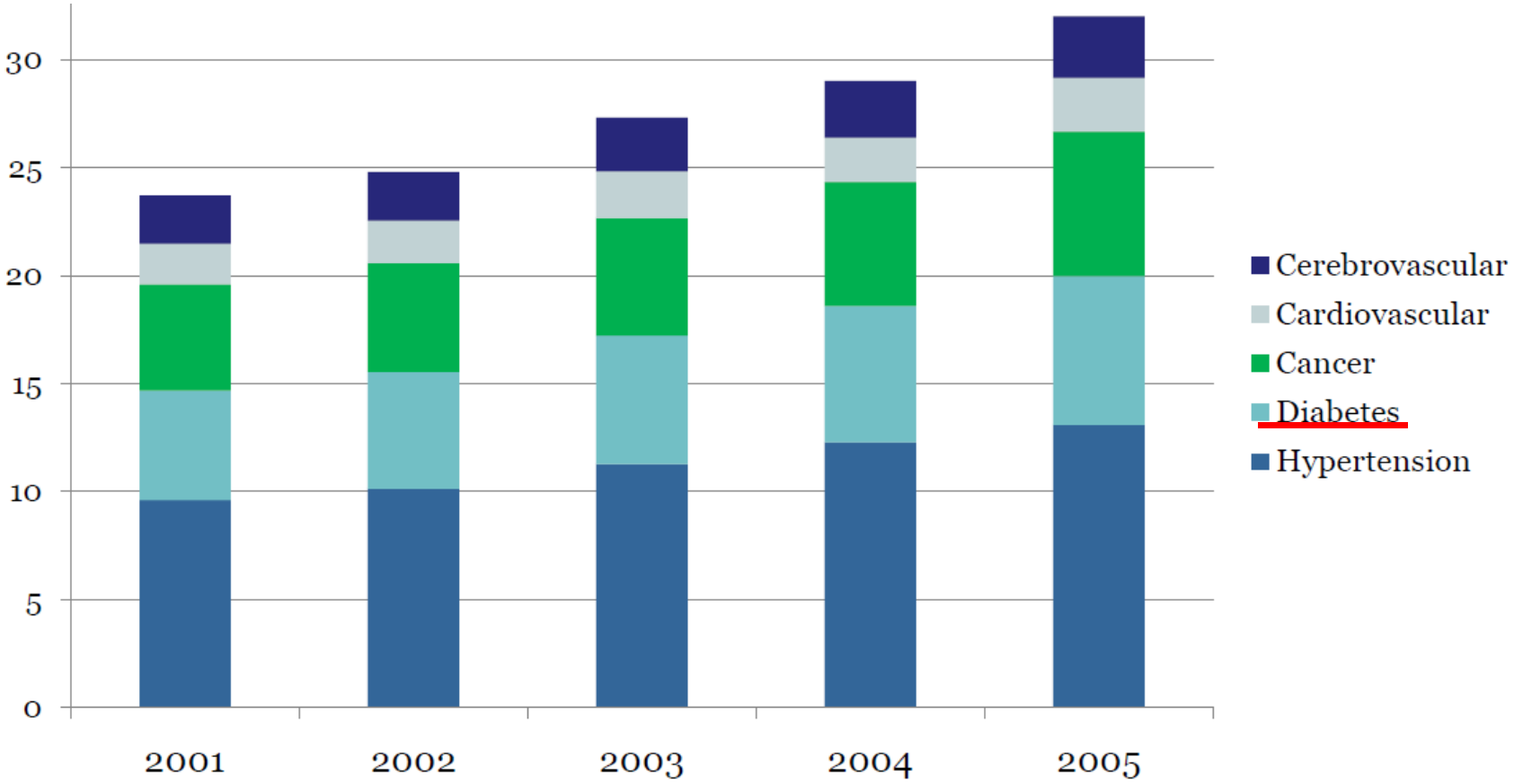


Source: OECD Health Data 2011

Average **length of stay in hospital** for all cause, 2000 & 2009

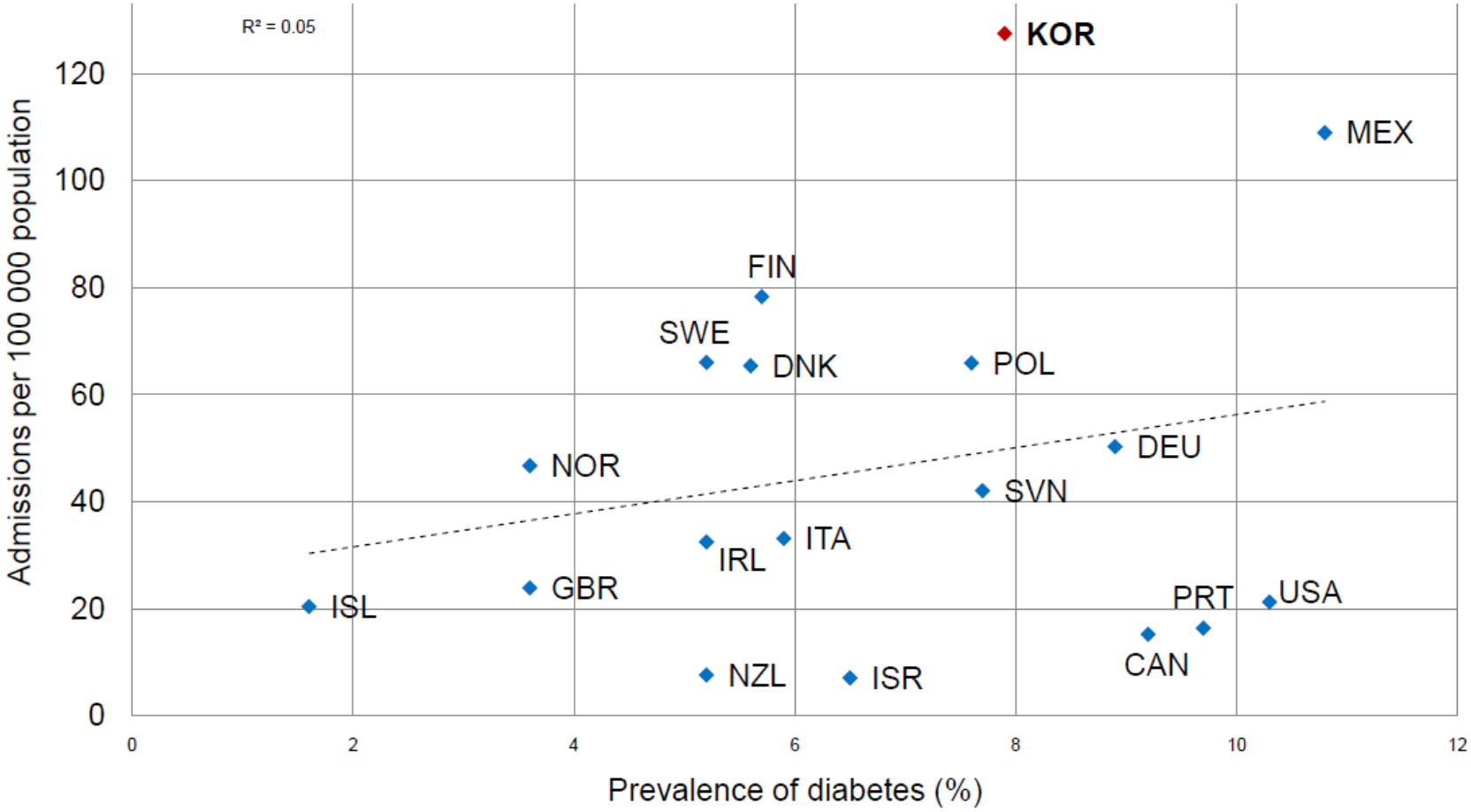


Proportion of NIH **medical expenses** accounted for by **chronic disease**, by category



Source: Lee, S. and Yun, K. (2009), "Policy Recommendations for the Advancement of Health Care", Korea Institute for Health and Social Affairs Working Paper 2009-03

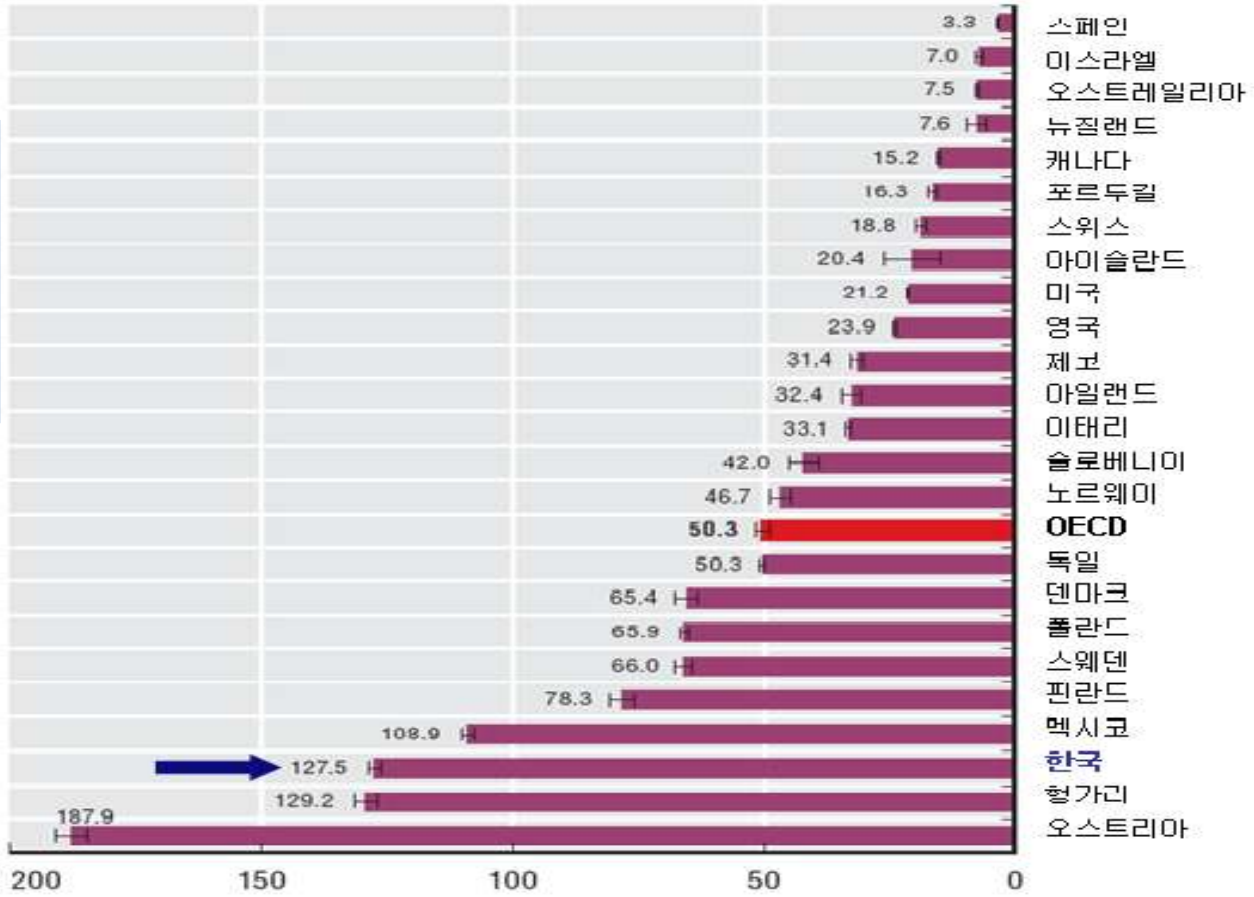
Uncontrolled diabetes hospital admission rates & prevalence of diabetes across OECD countries, 2009



Source: International Diabetes Foundation (2009) for prevalence estimates; OECD Health Data 2011 for hospital admission rates.

Uncontrolled diabetes hospital admission rates

조절되지 않는 **당뇨 입원율은**
인구 10만명당 127.5명으로
OECD 회원국 평균에 비해
성과 저조

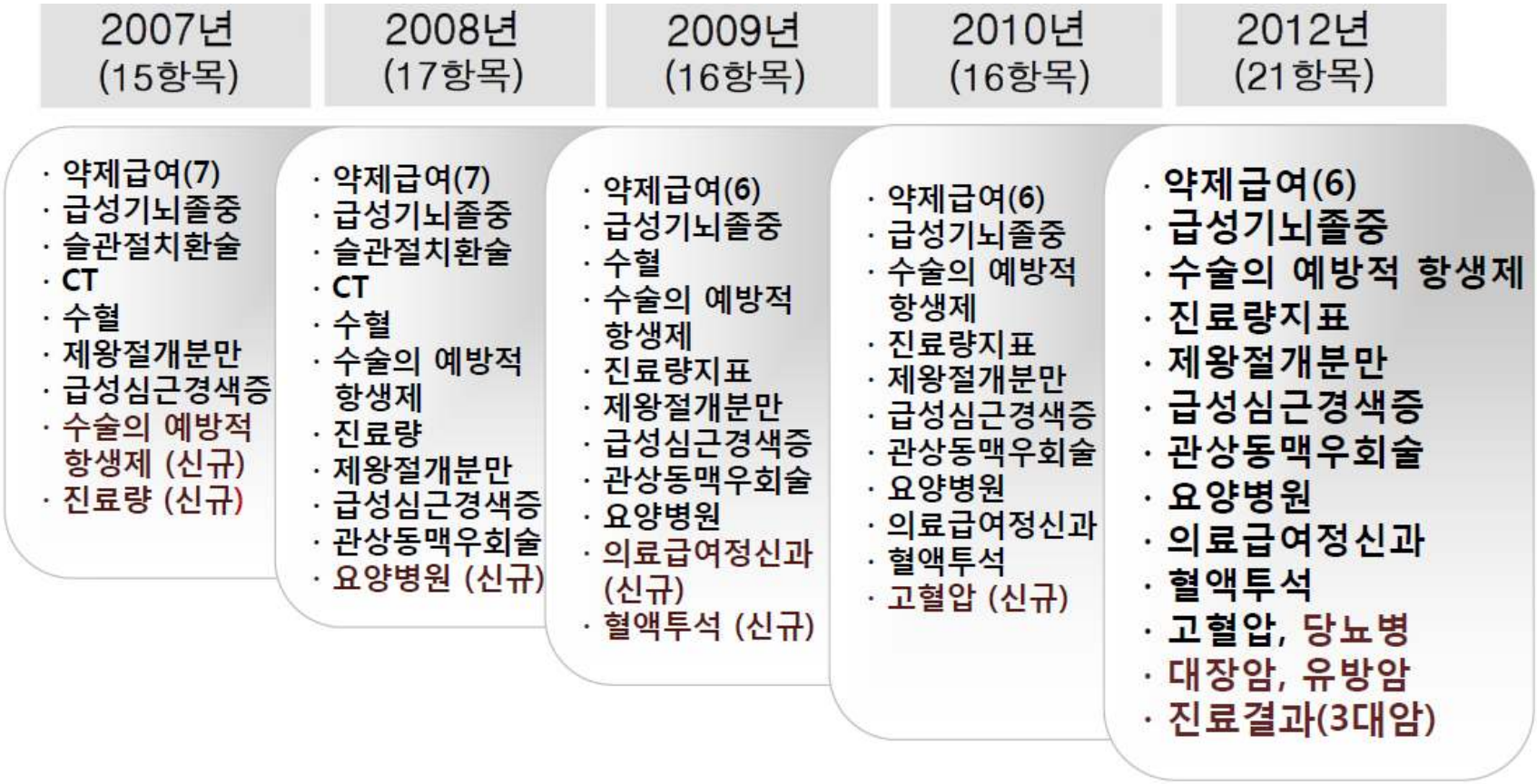


인구 10만명당 성-연령 표준화율
조절되지 않는 당뇨 입원율, 15세 이상, 2009

2. Evaluation & Policy of Diabetes Care

- Insurance
- Diabetes Education

적정성 평가현황


2007년 (15항목)
· 약제급여(7)
· 급성기뇌졸중
· 슬관절치환술
· CT
· 수혈
· 제왕절개분만
· 급성심근경색증
· 수술의 예방적 항생제 (신규)
· 진료량 (신규)
2008년 (17항목)
· 약제급여(7)
· 급성기뇌졸중
· 슬관절치환술
· CT
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· 수술의 예방적 항생제
· 진료량
· 제왕절개분만
· 급성심근경색증
· 관상동맥우회술
· 요양병원 (신규)
2009년 (16항목)
· 약제급여(6)
· 급성기뇌졸중
· 수혈
· 수술의 예방적 항생제
· 진료량지표
· 제왕절개분만
· 급성심근경색증
· 관상동맥우회술
· 요양병원
· 의료급여정신과 (신규)
· 혈액투석 (신규)
2010년 (16항목)
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· 급성기뇌졸중
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· 관상동맥우회술
· 요양병원
· 의료급여정신과
· 혈액투석
· 고혈압 (신규)
2012년 (21항목)
· 약제급여(6)
· 급성기뇌졸중
· 수술의 예방적 항생제
· 진료량지표
· 제왕절개분만
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· 관상동맥우회술
· 요양병원
· 의료급여정신과
· 혈액투석
· 고혈압, 당뇨병
· 대장암, 유방암
· 진료결과(3대암)

당뇨병평가지표

구분	세부영역		지표명
평가지표	치료 지속성	외래방문	분기별 1회 이상 방문 환자비율
		처방지속성	처방 일수율
	처방		동일 성분군 중복 처방률
			4성분군 이상 처방률
	검사		당화혈색소 검사 시행률
			지질 검사 시행률
			안저 검사 시행률
모니터링	처방		투약일당 약품비
	검사		미량알부민뇨 검사 시행률

의원급 만성질환제도 개요

- 지속이용 환자에 대한 인센티브('12.4.1. 시행)
  - 의원을 이용하는 고혈압 및 당뇨병 환자 본인부담률을 감면 (30% → 20%) (총 소요재정 약 350억원)
  - ☞건강보험법 시행령 개정(12.3.26), 보건복지부 고시 2012-39호
- 의료서비스의 질 향상을 위한 의료기관 인센티브
  - 질 평가를 통한 의원 의료기관 인센티브 및 보수교육 여부에 대한 가점 인정 (총 소요재정 약 350억원)
  - ☞만성질환관리에 대한 가산지급 기준 고시 제정(고시2012-101호,´12.8.21.)

보건복지부 고시안 :
당뇨병 교육 상담료 인정 비급여 기준 (2011년)

1. **당뇨병**, 고혈압, 심장질환 등 특정환자 및 질환에 대하여 **교육 • 상담** 등을 통하여 환자가 자신의 질병을 이해하고 합병증을 예방할 수 있도록 관리체계를 수립한 경우에 산정한다.
2. 교육은 담당의사의 지시 하에 실시하며, 교육자는 **미리 계획된 교육프로그램**에 의해 실시한 교육 관련 내용을 진료기록부에 기록 • 관리하여야 한다.
3. 요양기관별로 교육자 중 **상근하는 교육전담인력을 배치**하여야 하며, 교육이 원활히 이루어질 수 있는 **별도의 공간**을 확보하고 교육별로 전과정을 **30분** 이상 실시하여야 한다.
4. 교육프로그램 전과정을 포함한 **비용을 1회 산정**하며, 이 비용에는 교육프로그램 일부내용의 **반복교육 및 추후관리**가 포함된다. 단, 치태조절 교육의 경우는 평생 1회 산정한다.
5. 교육시작 전 소정양식의 '**교육 • 상담료 점검표 및 환자동의서**'를 작성하여야 한다.
6. 권고사항 : 요양기관은 질환별로 교육 • 상담을 실시 한 후에는 **환자의 만족도, 건강상태 변화 수준의 효과평가와 실시현황을 별도 관리하여 교육 • 상담의 질 향상**을 위해 노력한다.

6. 교육실시 후 환자의 만족도와 건강상태 변화수준을 평가하도록 한다.

: 환자의 만족도와 이해도는 대상자에 따라서 상, 중, 하로 평가하며 건강상태 변화 수준은 다음 외래 진료날짜나 교육 날짜를 기록하고 SMBG 결과, 생활습관의 변화, 혈액검사 등으로 평가할 수 있다.

교육 효과평가	환자이해도	상 중 하
	환자만족도	상 중 하
	건강상태변화	

3. What is "Outcome of Diabetes Care"?

What is “Outcome Research”?

- Related terms:
  - Health services research

"the integration of epidemiologic, sociological, economic, and other analytic sciences in the study of health services. Health services research is usually concerned with relationships between need, demand, supply, use, and outcome of health services. The aim of the research is evaluation, particularly in terms of structure, process, output and outcome"

  - Outcome assessment (health care)

"research aimed at assessing the quality and effectiveness of health care as measured by the attainment of a specified end result or outcome. Measures include parameters such as improved health, lowered morbidity or mortality, and improvement of abnormal states (such as elevated blood pressure)"

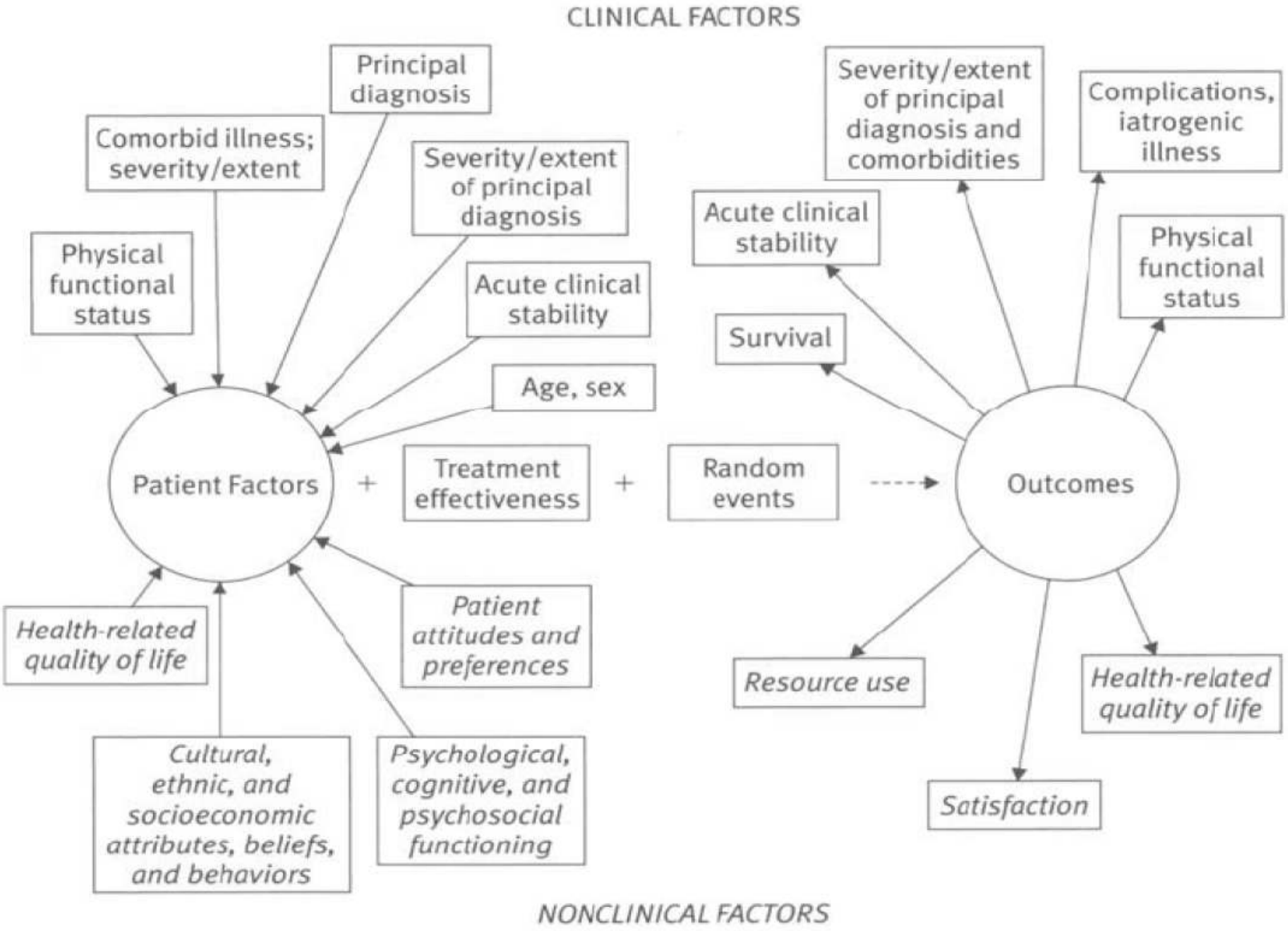
Jefford, M., Stockler, M.R., & Tattersall, M.H.N. (2003). Internal Medicine Journal

Key steps in outcomes research

- Define a researchable question
- Develop a conceptual model
- Identify the critical dependent and independent variables
- Identify appropriate measures for each
- Develop an analysis plan

Potential Outcomes of Interest

- Death
- Complications
- Failure-to-Rescue
- Length of Stay
- Readmissions
- Satisfaction
- Quality of Life


CLINICAL FACTORS
Principal diagnosis
Comorbid illness; severity/extent
Severity/extent of principal diagnosis
Physical functional status
Acute clinical stability
Age, sex
Patient Factors
+
Treatment effectiveness
+
Random events
Severity/extent of principal diagnosis and comorbidities
Complications, iatrogenic illness
Acute clinical stability
Physical functional status
Survival
Outcomes
Health-related quality of life
Patient attitudes and preferences
Resource use
Health-related quality of life
Cultural, ethnic, and socioeconomic attributes, beliefs, and behaviors
Psychological, cognitive, and psychosocial functioning
Satisfaction
NONCLINICAL FACTORS

Intervention

Types of interventions

- Specialist nurse intervention in addition to routine care versus routine care at individual patient level.
- Paediatric specialist nurse intervention versus routine care at individual patient level in the management of children with diabetes.

Timing of outcome measurements

Medium (6-12 months) and long term (more than 12 months) outcome measurements were assessed.

Outcome

Types of outcome measures

Primary outcomes

Outcome measures reflected the different stages of the disease in which the specialist nurse was involved:

- glycosylated haemoglobin (HbA1c);
- sort term diabetic complications (hypoglycaemic episodes, ketoacidotic incidents);
- long term diabetic complications (e.g. diabetic retinopathy, neuropathy, nephropathy).

Secondary outcomes

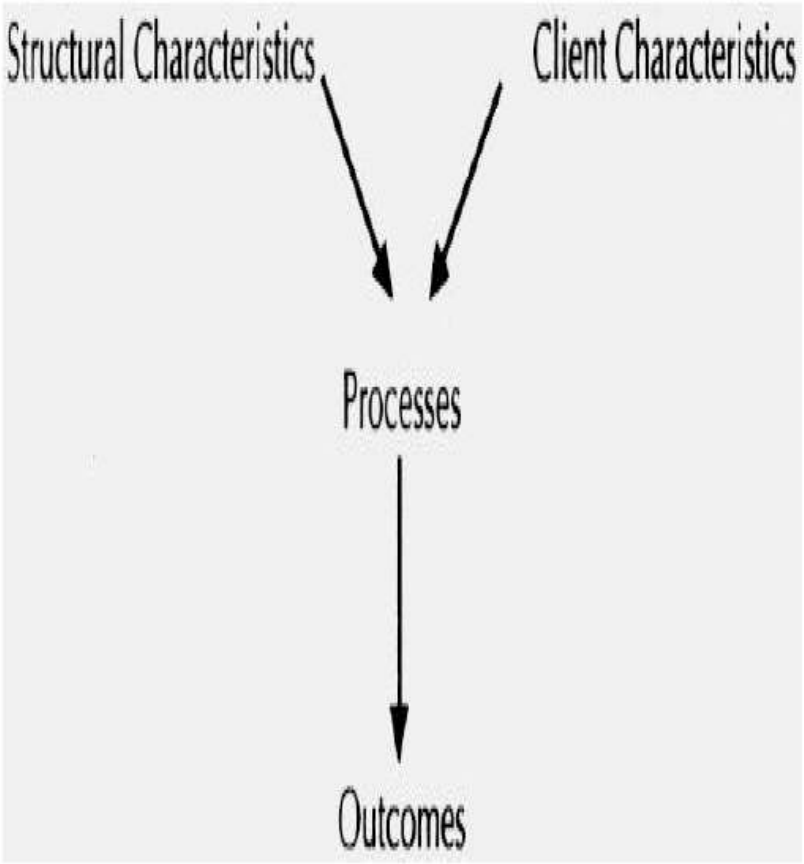
- mortality;
- emergency admissions;
- quality of life, ideally using a validated instrument;
- body mass index (BMI);
- costs:
- adverse effects.

Measuring Quality: Donabedian Model

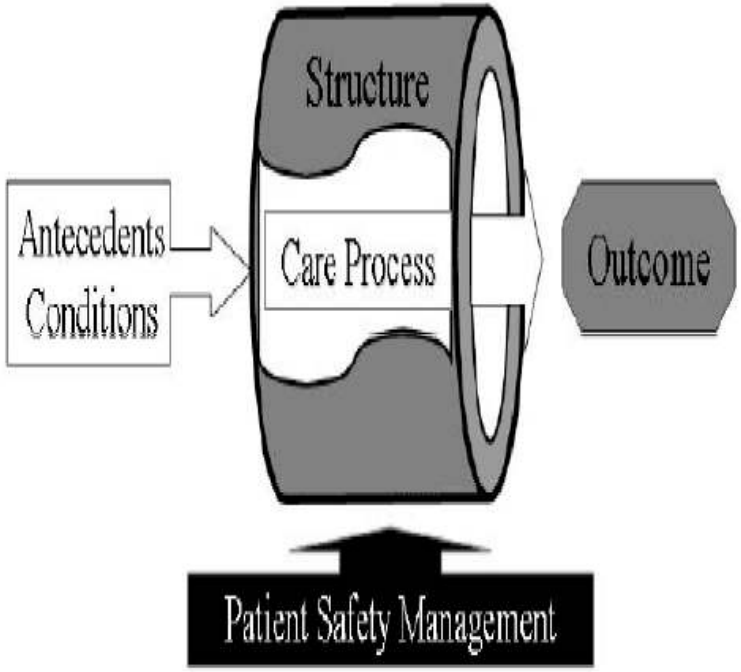
STRUCTURE→PROCESS→OUTCOME

- Structure: the way a health care system is set up and the conditions under which care is provided
  - The Environment
  - The Organization
  - The Staff
  - The Financial Structure/Incentives
- Process
  - The care provided (components of process: e.g. tests ordered)
  - The algorithms of care
- Outcomes
  - What happened to the patient's health, happiness (utility), Improvements in symptoms

Based on Donabedian Model

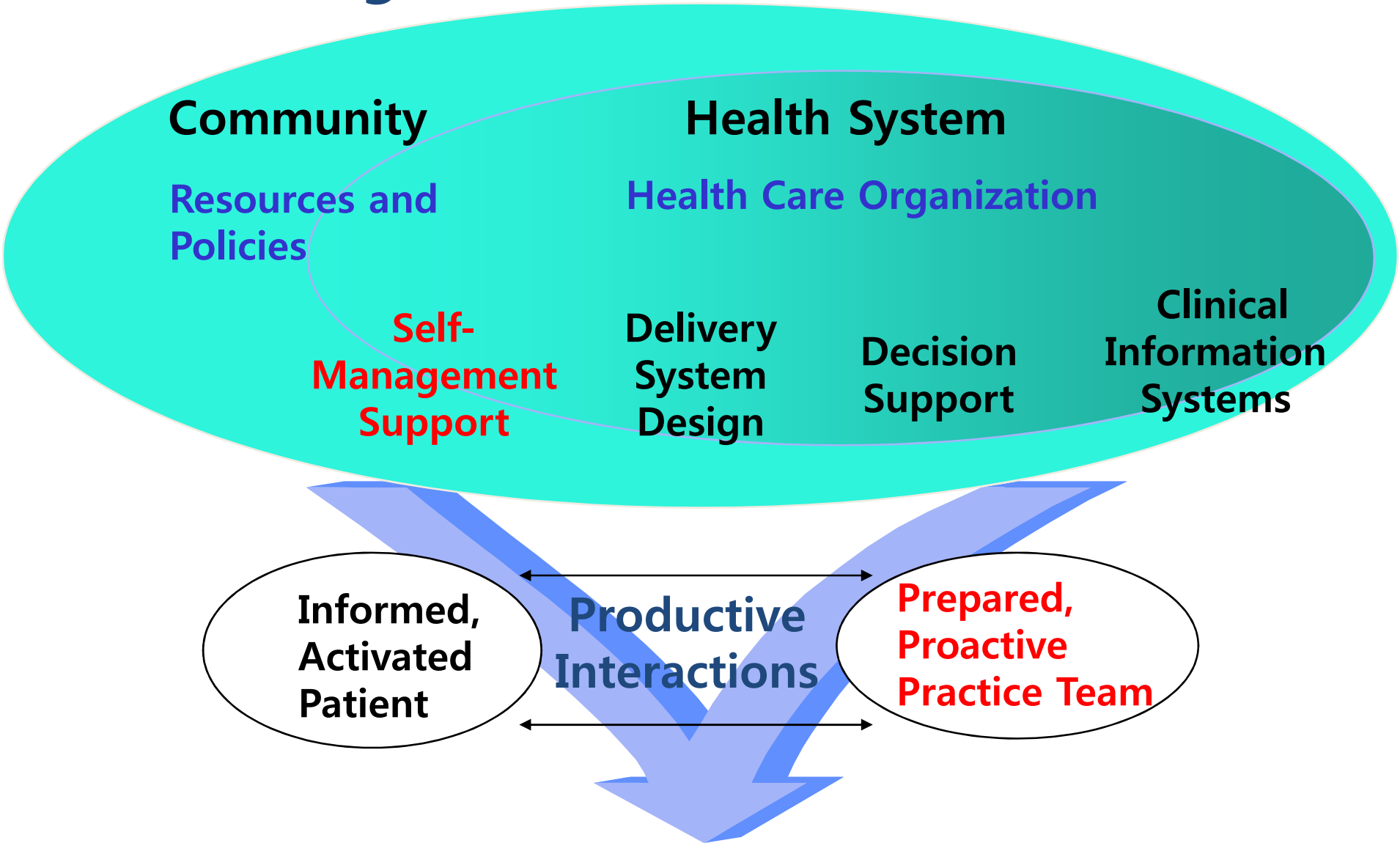


Iezzoni, L. (1994). Risk adjustment for measuring health outcomes.



Battles and Lilford (2003). Quality and Safety in Health Care

Wagner's Chronic Care Model



4. Measurement of Nursing Outcome in Diabetes Education

Evidence of the effectiveness of diabetes

- Evidence of the effectiveness of diabetes specialist nurses is at present **unclear**.
- Patients in contact with specialist nurses are generally satisfied with the level of care that they receive (Gafvels 1996) and it is thought that patients often contact the specialist nurses in preference to their general practices.

National Standards for Diabetes Self-Management Education and Support

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GRETCHEN YOUSSEF, MS, RD, CDE[18]
ON BEHALF OF THE 2012 STANDARDS REVISION TASK FORCE

Diabetes Care Publish Ahead of Print, published online September 20, 2012

National Standards for Diabetes Self-Management Education & Support

- Internal structure
- External input
- Access
- Program coordination
- Instructional staff
- Curriculum
- Individualization
- Ongoing support
- Patient progress
- Quality improvement

Interaction Model of Client Health Behavior (IMCHB, 1982)

: 대상자 건강행위의 상호작용 모델

Cheryl Cox, PhD
St. Jude Children's Research Hospital

Elements of client singularity

- Background variables (배경 변인)
- Motivation (내적 동기화)
- Cognitive appraisal (인지적 평가)
- Affective response to the health concern (정서적 반응)

Elements of Client-professional interaction

- Affective support (정서적 지지)
- Health information (건강 정보)
- Decisional control (의사결정 통제)
- Professional-technical competencies (전문가적/ 기술적 능력)

Elements of health outcome

- Utilization of health care services (건강관리 서비스의 이용)
- Clinical health status indicators (임상적 건강상태 지표)
- Severity of health care problem (건강관리 문제의 중증도)
- Adherence to the recommended care regimens (권장된 관리 지시에 대한 고수)
- **Satisfaction with care** (건강관리에 대한 만족)

PRACTICE

The interaction model of client health behavior: A model for advanced practice nurses

Susan K. Mathews, MSN, RN, FNP, Janet Secrest, PhD, RN (UC Foundation Professor), & Lisa Muirhead, MSN, RN, FNP (Lecturer)

School of Nursing, University of Tennessee at Chattanooga, Chattanooga, Tennessee

Keywords
Interaction Model of Client Health Behavior; health outcomes; client–professional interaction.

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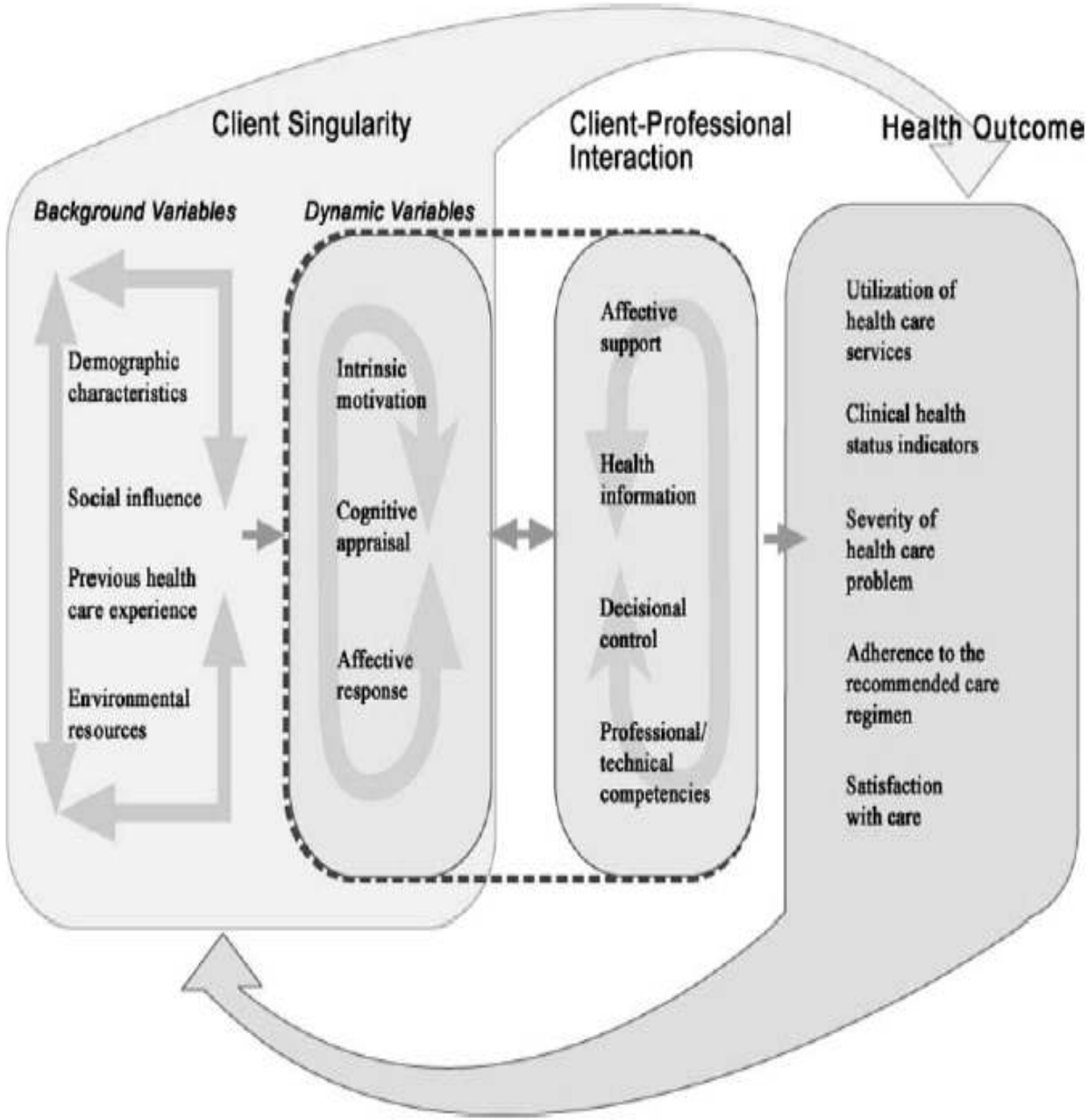
Received: June 2007; accepted: October 2007

doi:10.1111/j.1745-7599.2008.00343.x

Abstract

Purpose: To present the Interaction Model of Client Health Behavior (IMCHB) as a model to guide nurse practitioners (NPs) in their practice.
Data sources: Selected research-based articles on Cox's IMCHB and selected text and writings on the NP movement and nursing practice models.
Conclusions: Many NPs practice in a medical setting where the boundaries between medicine and nursing are blurred. The IMCHB offers a nursing model to guide NPs in their practice.
Implications for practice: A nursing model that examines the elements of client uniqueness and assesses the interaction between NP and client can achieve positive health outcomes.

Journal of the American Academy of Nurse Practitioners *20* (2008) 415–422


Client Singularity
Client-Professional Interaction
Health Outcome
Background Variables
Dynamic Variables
Demographic characteristics
Social influence
Previous health care experience
Environmental resources
Intrinsic motivation
Cognitive appraisal
Affective response
Affective support
Health information
Decisional control
Professional/ technical competencies
Utilization of health care services
Clinical health status indicators
Severity of health care problem
Adherence to the recommended care regimen
Satisfaction with care

Development and Evaluation of **Integrated Self-Management Program** for Women with **Gestational Diabetes Mellitus**

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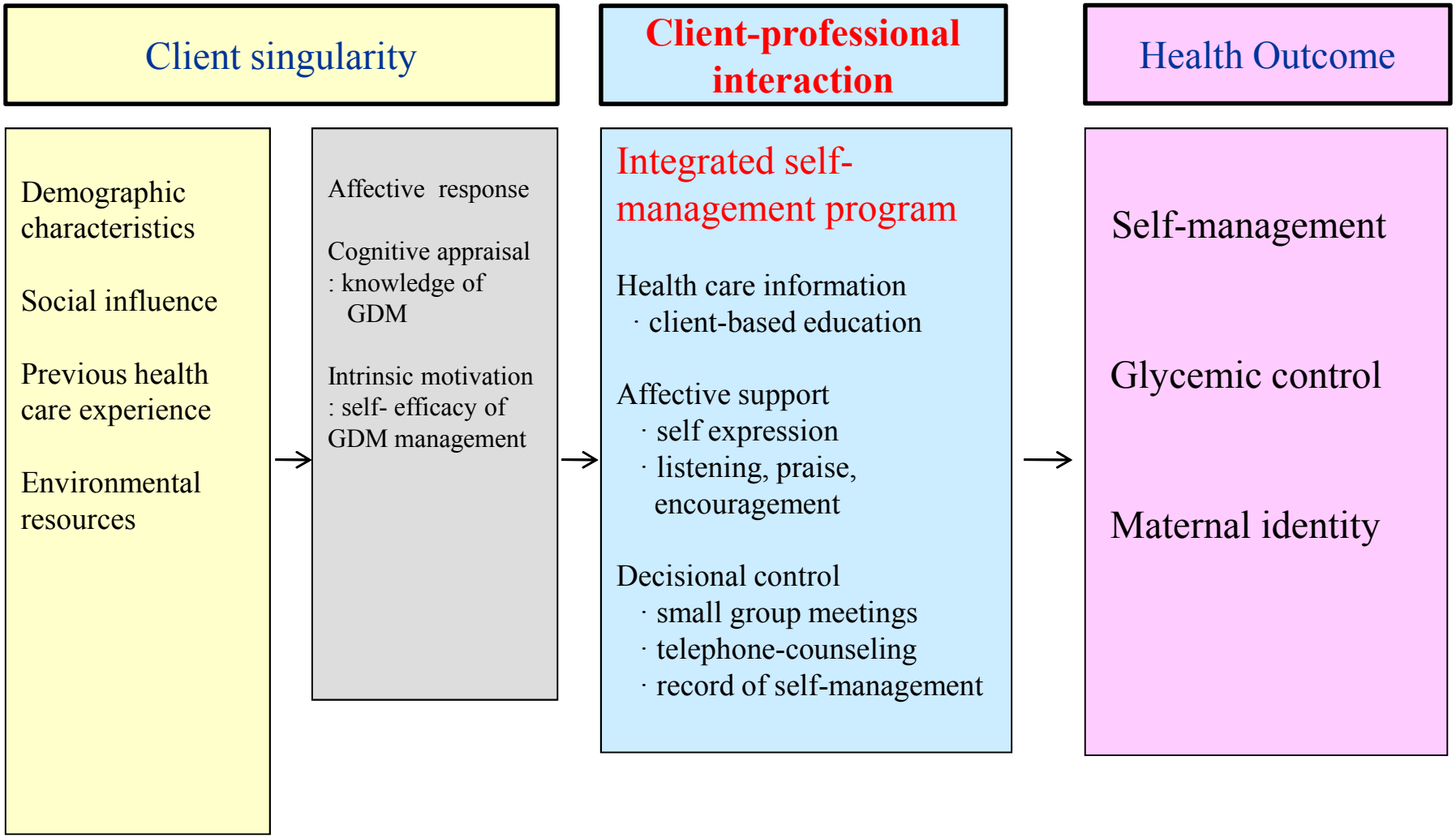
Protocol of integrated self-management program

Times	1	2	3	4	5
Gestation (Weeks)	29-30	30-31	31-32	32-33	33-34
Topic	**Introduction & Management of GDM**	Compliance of self-management	**Effects of GDM on maternal-Newborn**	Compliance of self-management	**Care & Prevent of DM in postpartum**
Content	• Check of SM list • Q&A • Introduction of GDM • Diet • Emotional support • *Taekyo* • Abdominal breathing		• Check of SM list • Q&A • Exercise • Stress management • Emotional support • *Taekyo* • Abdominal breathing • Effects of GDM on maternal-Newborn		• Check of SM list • Q&A • Prevent of DM in postpartum • Emotional support • *Taekyo* • Abdominal breathing • Delivery • Breastfeeding • Postpartum care
Method	Small group meeting (Education & Support)	Telephone-counseling	Small group meeting (Education & Support)	Telephone-counseling	Small group meeting (Education & Support)

GDM : Gestational Diabetes Mellitus, SM: Self-management

Conceptual framework



GDM : Gestational Diabetes Mellitus

Cox's Interaction Model of Client Health Behavior (IMCHB, 1982)

Table3. Difference in self-management between the experimental and control groups

(n=55)

variable	range		Experimental (n=28) M±SD	Control (n=27) M±SD	z	p
Total	0-56	Pre-test	37.75±8.27	35.55±8.67	-1.037	.300
		Post-test	43.85±6.51	34.55±9.06	-3.802	**<.001**
Diet	0-28	Pre-test	19.21±4.49	18.30±4.50	-0.76	.452
		Post-test	21.82±3.74	17.67±4.84	-3.57	**<.001**
Exercise	0-8	Pre-test	4.57±2.25	4.19±2.35	-0.62	.536
		Post-test	5.93±1.74	4.07±2.00	-3.67	**<.001**
Stress management	0-4	Pre-test	1.96±1.32	1.56±1.25	-1.18	.243
		Post-test	1.96±1.32	1.56±1.25	-3.31	.243
SMBG	0-14	Pre-test	10.00±2.28	9.52±2.82	-0.70	.488
		Post-test	11.29±1.76	9.22±2.76	-1.18	**<.001**
Abdominal breathing	0-4	Pre-test	1.96±1.32	1.56±1.25	-1.18	.243
		Post-test	1.96±1.32	1.56±1.25	-3.31	.243

p <.05

Table4. Difference in glycemic control between the experimental and control groups

(n=55)

variable		Experimental (n=28)	Control (n=27)	z	p
		M±SD	M±SD		
2-hour postprandial Glucose (mg/dL)	Pre-test	105.07±17.82	106.08±14.12	-0.418	.676
	3rd week	**101.71± 8.43**	**109.22±16.37**	-1.98	**.047**
	Post-test	101.93± 9.54	108.04±13.97	-1.568	.117
	Mean	**101.82± 7.60**	**108.62±12.64**	-2.434	**.015**
HbA1c (%)	Pre-test	5.33± 0.42	5.24± 0.41	-8.837	.403
	Post-2week	5.50± 0.44	5.35± 0.42	-1.179	.238

p <.05

Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups (Review)

Hawthorne K, Robles Y, Cannings-John R, Edwards AGK

This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2008, Issue 3

http://www.thecochranelibrary.com

ABSTRACT

Background

Ethnic minority groups in upper-middle and high income countries tend to be socio-economically disadvantaged and to have higher prevalence of type 2 diabetes than the majority population.

Objectives

To assess the effectiveness of culturally appropriate diabetes health education on important outcome measures in type 2 diabetes.

Search methods

We searched the *The Cochrane Library*, MEDLINE, EMBASE, PsycINFO, CINAHL, ERIC, SIGLE and reference lists of articles. We also contacted authors in the field and handsearched commonly encountered journals.

Selection criteria

RCTs of culturally appropriate diabetes health education for people over 16 years with type 2 diabetes mellitus from named ethnic minority groups resident in upper-middle or high income countries.

Data collection and analysis

Two authors independently assessed trial quality and extracted data. Where there were disagreements in selection of papers for inclusion, all four authors discussed the studies. We contacted study authors for additional information when data appeared to be missing or needed clarification.

Main results

Eleven trials involving 1603 people were included, with ten trials providing suitable data for entry into meta-analysis. Glycaemic control (HbA1c), showed an improvement following culturally appropriate health education at three months (weight mean difference (WMD) - 0.3%, 95% CI -0.6 to -0.01), and at six months (WMD -0.6%, 95% CI -0.9 to -0.4), compared with control groups who received

'usual care'. This effect was not significat at 12 months post intervention (WMD -0.1%, 95% CI -0.4 to 0.2). Knowledge scores also improved in the intervention groups at three months (standardised mean difference (SMD) 0.6, 95% CI 0.4 to 0.7), six months (SMD 0.5, 95% CI 0.3 to 0.7) and twelve months (SMD 0.4, 95% CI 0.1 to 0.6) post intervention. Other outcome measures both clinical (such as lipid levels, and blood pressure) and patient centred (quality of life measures, attitude scores and measures of patient empowerment and self-efficacy) showed no significant improvement compared with control groups.

Authors' conclusions

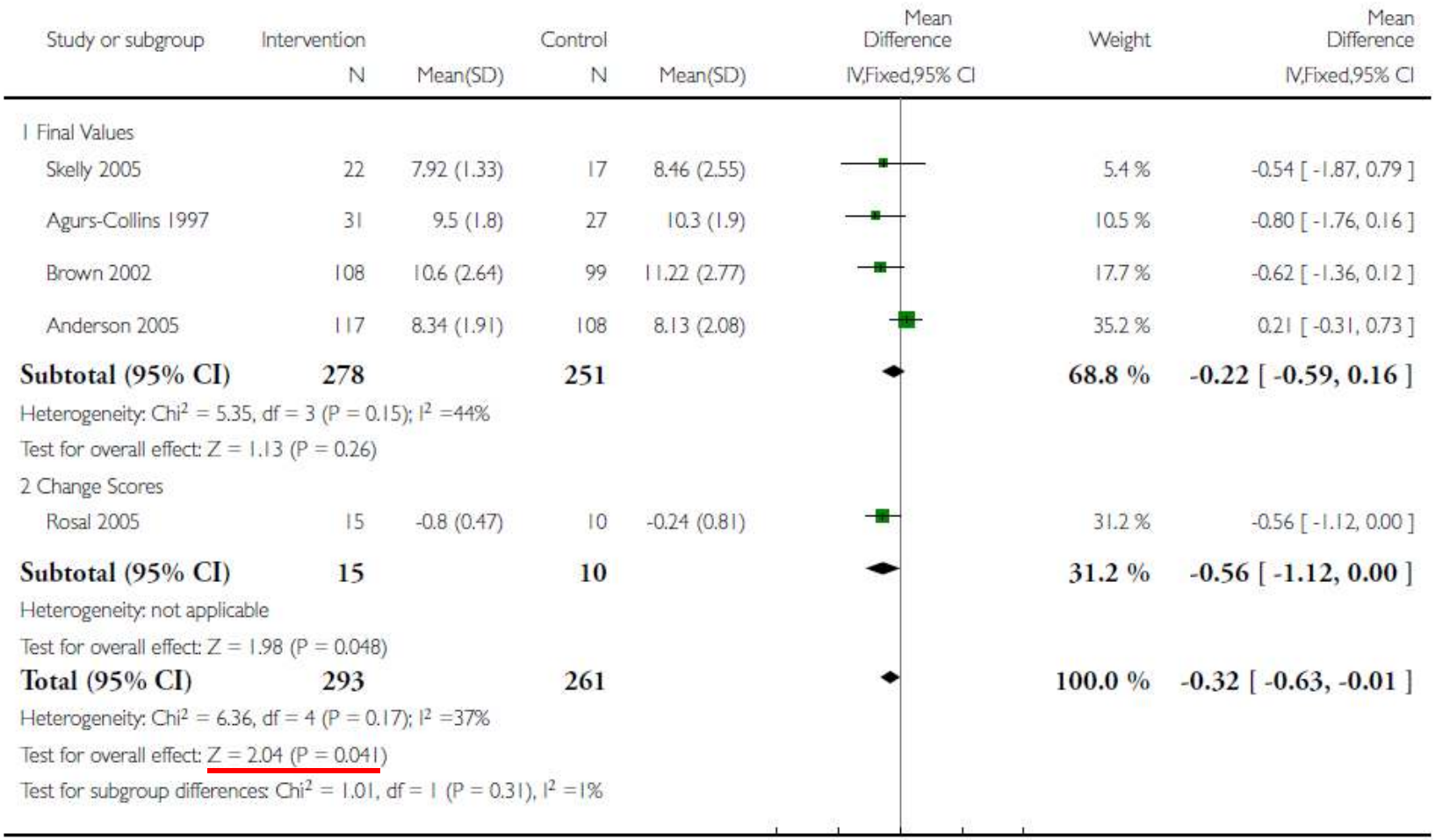
Culturally appropriate diabetes health education appears to have short term effects on glycaemic control and knowledge of diabetes and healthy lifestyles. None of the studies were long-term, and so clinically important long-term outcomes could not be studied. No studies included an economic analysis. The heterogeneity of studies made subgroup comparisons difficult to interpret with confidence. There is a need for long-term, standardised multi-centre RCTs that compare different types and intensities of culturally appropriate health education within defined ethnic minority groups.

Analysis 1.1. Comparison 1 Culturally tailored HE compared to conventional or usual diabetes health care, Outcome 1 Mean HbA1c up to three months.

Review: Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups

Comparison: 1 Culturally tailored HE compared to conventional or usual diabetes health care

Outcome: 1 Mean HbA1c up to three months

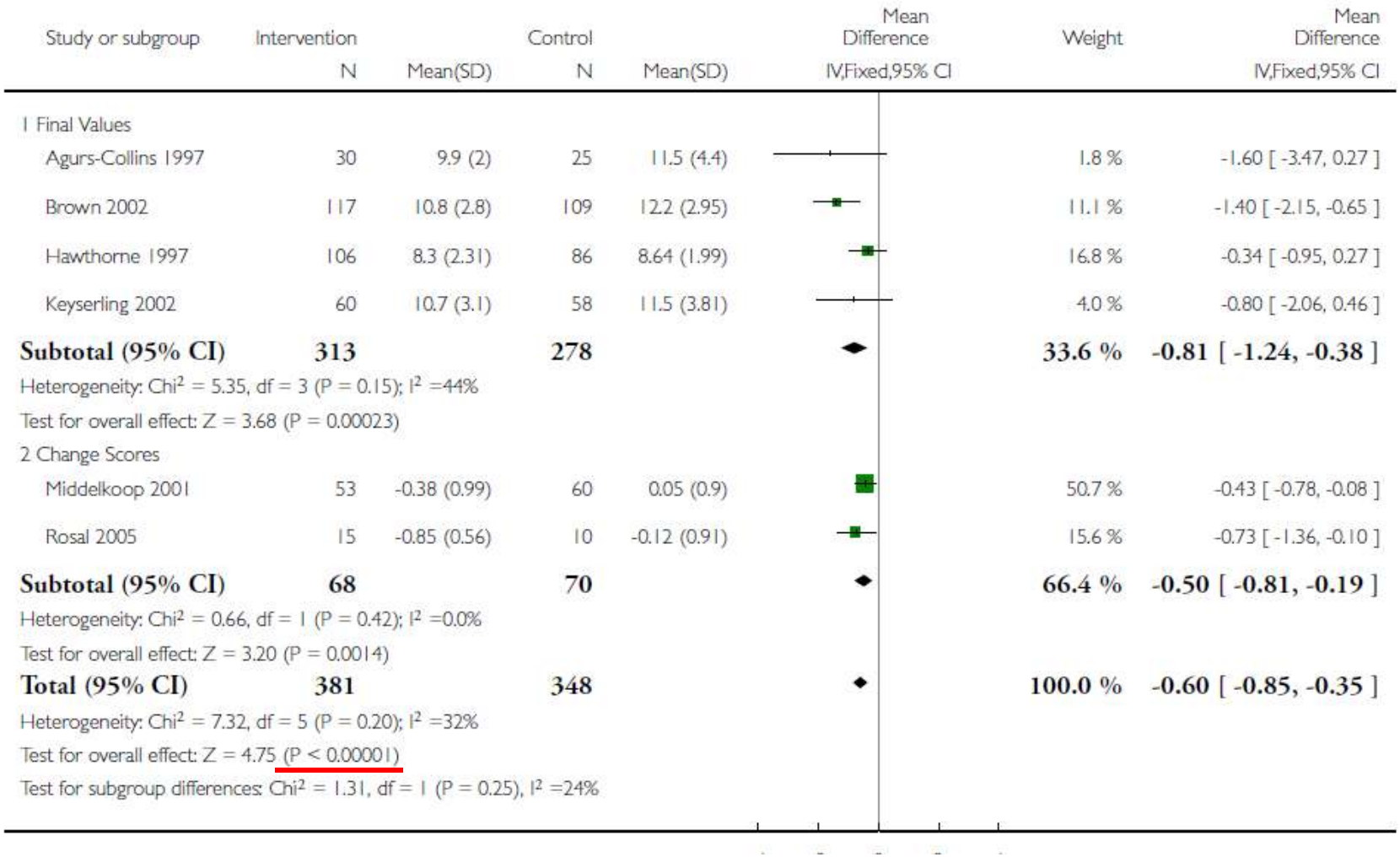


Analysis 1.2. Comparison 1 Culturally tailored HE compared to conventional or usual diabetes health care, Outcome 2 Mean HbA1c up to six months.

Review: Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups

Comparison: 1 Culturally tailored HE compared to conventional or usual diabetes health care

Outcome: 2 Mean HbA1c up to six months



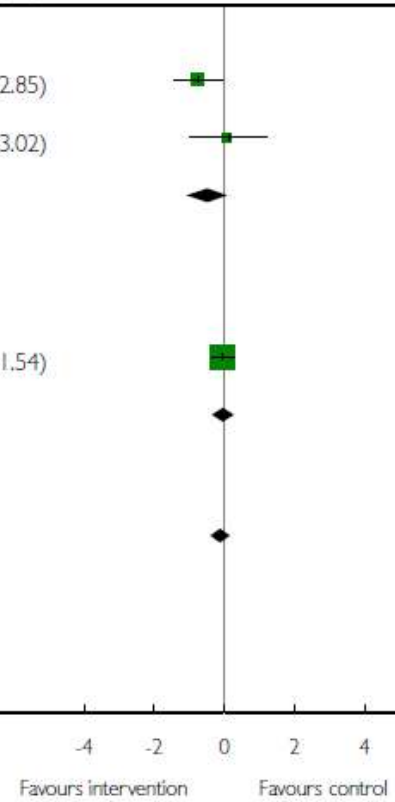
Analysis 1.3. Comparison 1 Culturally tailored HE compared to conventional or usual diabetes health care, Outcome 3 Mean HbA1c up to one year.

Review: Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups

Comparison: 1 Culturally tailored HE compared to conventional or usual diabetes health care

Outcome: 3 Mean HbA1c up to one year

Study or subgroup	Intervention N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 Final Values							
Brown 2002	112	10.89 (2.56)	112	11.64 (2.85)		16.0 %	-0.75 [-1.46, -0.04]
Keyserling 2002	54	10.8 (2.94)	57	10.7 (3.02)		6.5 %	0.10 [-1.01, 1.21]
Subtotal (95% CI)	**166**		**169**			**22.5 %**	**-0.50 [-1.10, 0.09]**
Heterogeneity: $Chi^2 = 1.60$, df = 1 (P = 0.21); I^2 =38%							
Test for overall effect: Z = 1.65 (P = 0.099)							
2 Change Scores							
O'Hare 2004	165	-0.23 (1.42)	160	-0.2 (1.54)		77.5 %	-0.03 [-0.35, 0.29]
Subtotal (95% CI)	**165**		**160**			**77.5 %**	**-0.03 [-0.35, 0.29]**
Heterogeneity: not applicable							
Test for overall effect: Z = 0.18 (P = 0.86)							
Total (95% CI)	**331**		**329**			**100.0 %**	**-0.14 [-0.42, 0.15]**
Heterogeneity: $Chi^2 = 3.47$, df = 2 (P = 0.18); I^2 =42%							
Test for overall effect: Z = 0.94 (P = 0.35)							
Test for subgroup differences: $Chi^2 = 1.86$, df = 1 (P = 0.17), I^2 =46%							



Analysis 1.4. Comparison 1 Culturally tailored HE compared to conventional or usual diabetes health care, Outcome 4 Mean systolic blood pressure up to three months (mmHg).

Review: Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups

Comparison: 1 Culturally tailored HE compared to conventional or usual diabetes health care

Outcome: 4 Mean systolic blood pressure up to three months (mmHg)

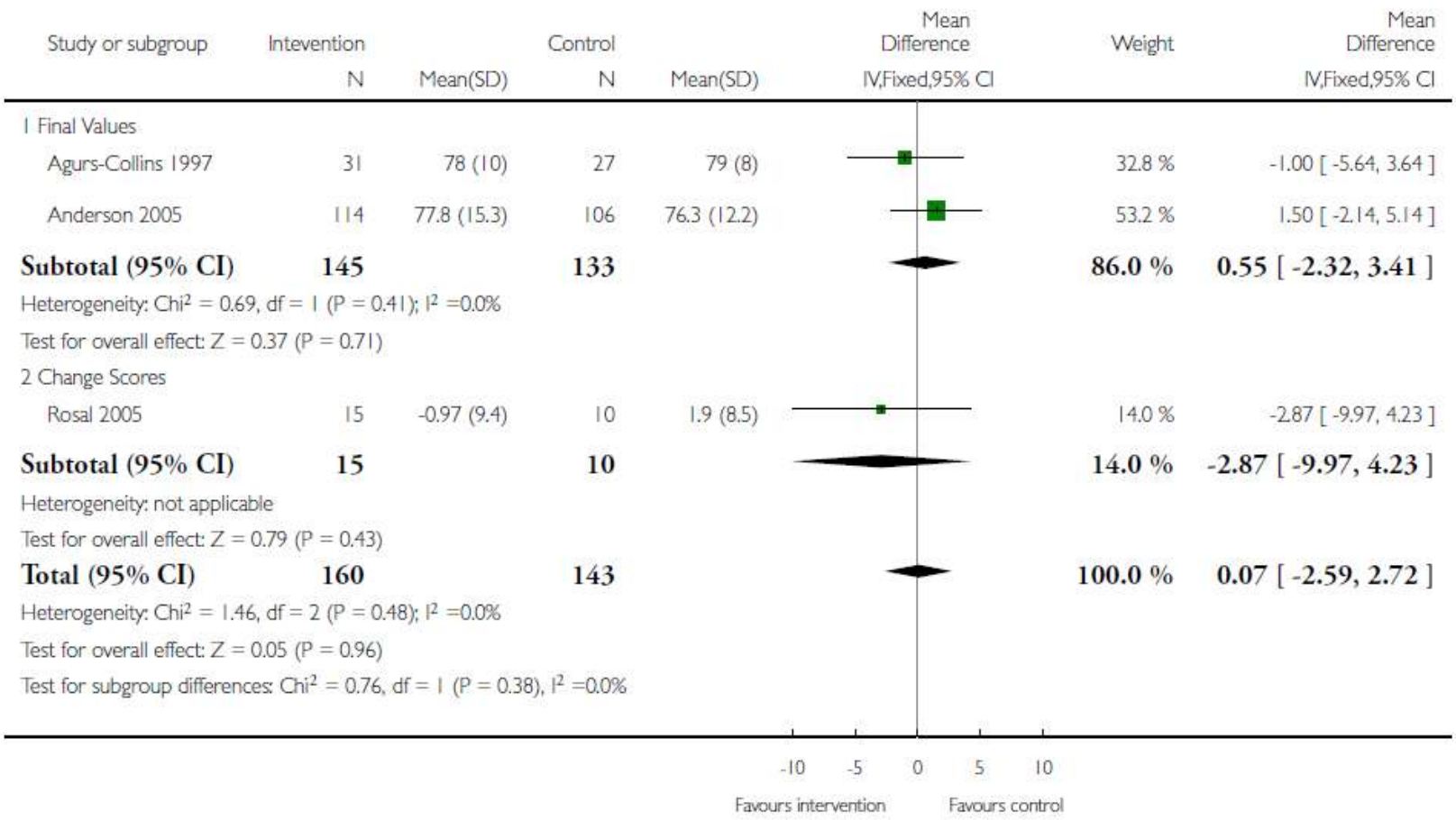
Study or subgroup	Intervention N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 Final Values							
Agurs-Collins 1997	31	144 (21)	27	148 (24)		16.3 %	-4.00 [-15.69, 7.69]
Anderson 2005	116	140.1 (23)	106	136.6 (21.6)		64.6 %	3.50 [-2.37, 9.37]
Subtotal (95% CI)	**147**		**133**			**80.8 %**	**1.99 [-3.25, 7.23]**
Heterogeneity: Chi^2 = 1.26, df = 1 (P = 0.26); I^2 =21%							
Test for overall effect: Z = 0.74 (P = 0.46)							
2 Change Scores							
Rosal 2005	15	5.4 (18.2)	10	1.4 (9)		19.2 %	4.00 [-6.77, 14.77]
Subtotal (95% CI)	**15**		**10**			**19.2 %**	**4.00 [-6.77, 14.77]**
Heterogeneity: not applicable							
Test for overall effect: Z = 0.73 (P = 0.47)							
Total (95% CI)	**162**		**143**			**100.0 %**	**2.38 [-2.34, 7.09]**
Heterogeneity: Chi^2 = 1.37, df = 2 (P = 0.50); I^2 =0.0%							
Test for overall effect: Z = 0.99 (P = 0.32)							
Test for subgroup differences: Chi^2 = 0.11, df = 1 (P = 0.74), I^2 =0.0%							

Analysis 1.5. Comparison 1 Culturally tailored HE compared to conventional or usual diabetes health care, Outcome 5 Mean diastolic blood pressure up to three months (mmHg).

Review: Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups

Comparison: 1 Culturally tailored HE compared to conventional or usual diabetes health care

Outcome: 5 Mean diastolic blood pressure up to three months (mmHg)

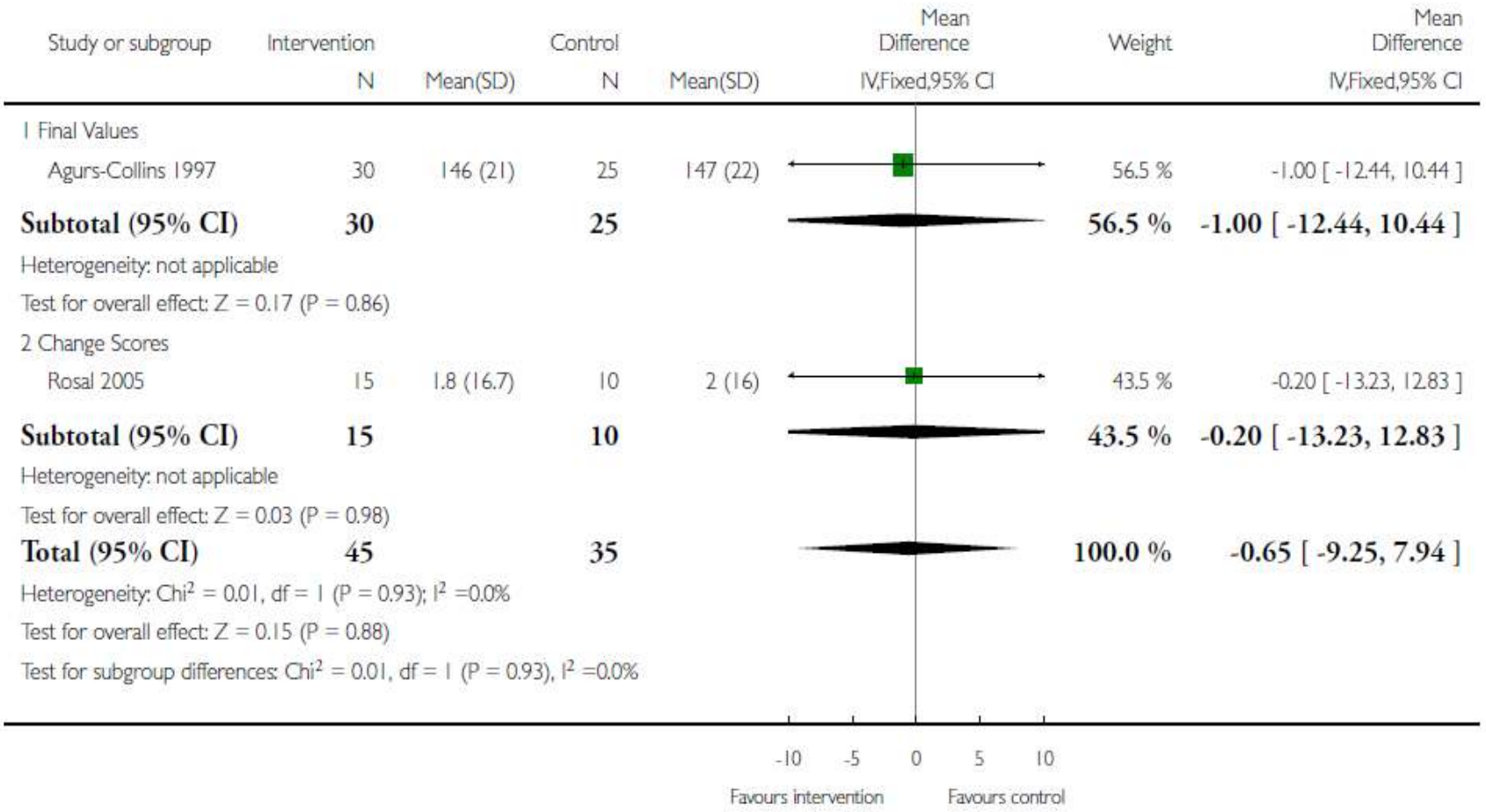


Analysis 1.6. Comparison 1 Culturally tailored HE compared to conventional or usual diabetes health care, Outcome 6 Mean systolic blood pressure up to six months (mmHg).

Review: Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups

Comparison: 1 Culturally tailored HE compared to conventional or usual diabetes health care

Outcome: 6 Mean systolic blood pressure up to six months (mmHg)

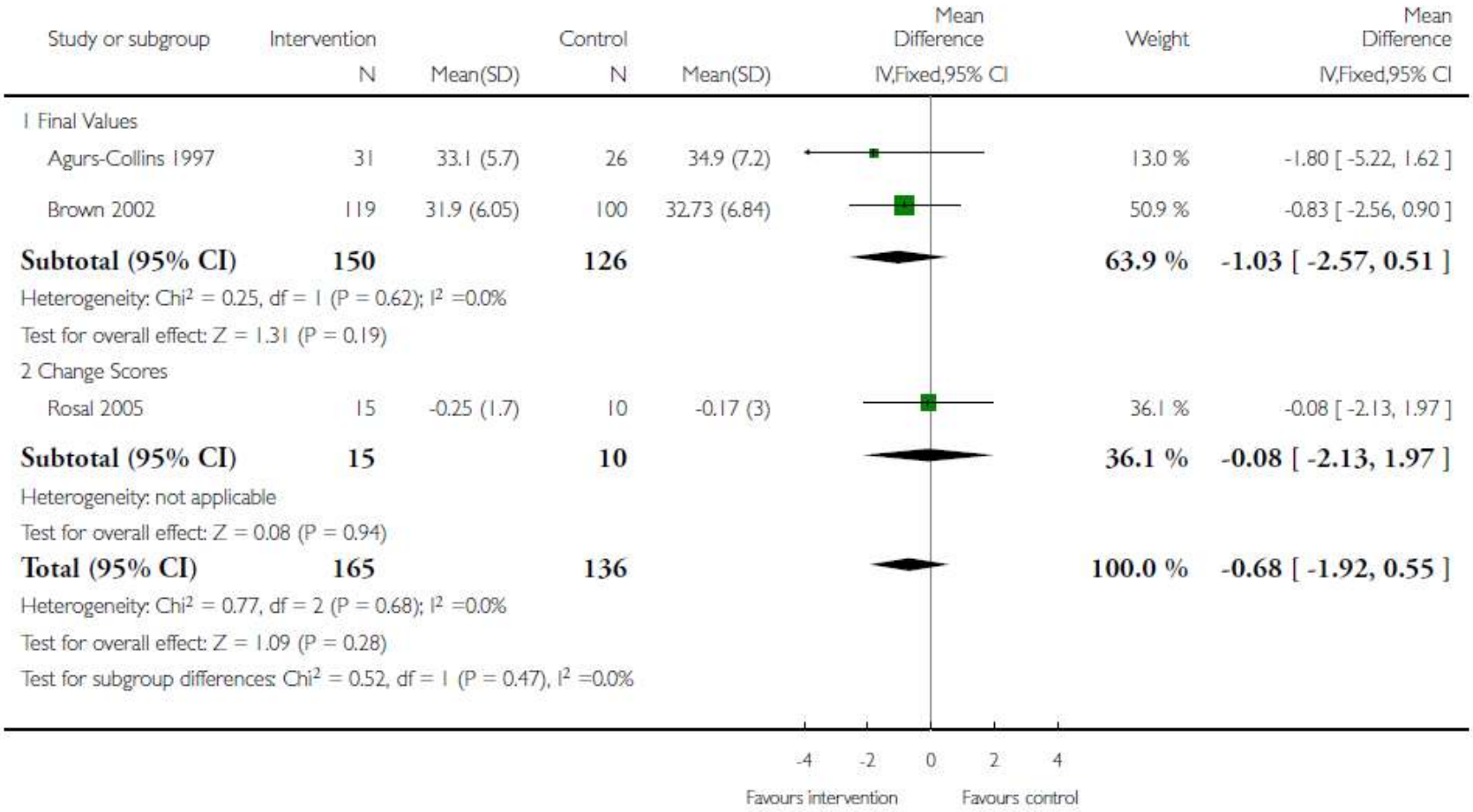


Analysis 1.12. Comparison 1 Culturally tailored HE compared to conventional or usual diabetes health care, Outcome 12 Mean BMI up to three months (kg/m2).

Review: Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups

Comparison: 1 Culturally tailored HE compared to conventional or usual diabetes health care

Outcome: 12 Mean BMI up to three months (kg/m2)



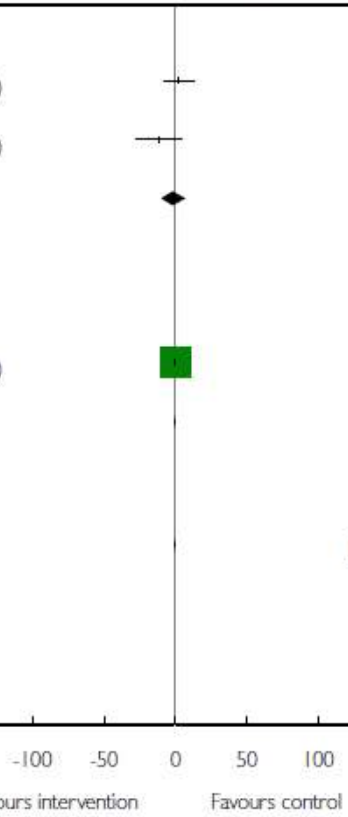
Analysis 1.16. Comparison 1 Culturally tailored HE compared to conventional or usual diabetes health care, Outcome 16 Mean Total cholesterol up to one year (mg/dl).

Review: Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups

Comparison: 1 Culturally tailored HE compared to conventional or usual diabetes health care

Outcome: 16 Mean Total cholesterol up to one year (mg/dl)

Study or subgroup	Intervention N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
1 Final Values							
Brown 2002	112	189.88 (36.35)	113	187.64 (42.66)		0.1 %	2.24 [-8.11, 12.59]
Keyserling 2002	54	193 (39.68)	57	204 (46.81)		0.0 %	-11.00 [-27.11, 5.11]
Subtotal (95% CI)	**166**		**170**			**0.1 %**	**-1.63 [-10.34, 7.08]**
Heterogeneity: Chi^2 = 1.84, df = 1 (P = 0.18); I^2 =46%							
Test for overall effect: Z = 0.37 (P = 0.71)							
2 Change Scores							
O'Hare 2004	165	-0.51 (1.31)	160	-0.12 (0.99)		99.9 %	-0.39 [-0.64, -0.14]
Subtotal (95% CI)	**165**		**160**			**99.9 %**	**-0.39 [-0.64, -0.14]**
Heterogeneity: not applicable							
Test for overall effect: Z = 3.03 (P = 0.0024)							
Total (95% CI)	**331**		**330**			**100.0 %**	**-0.39 [-0.64, -0.14]**
Heterogeneity: Chi^2 = 1.91, df = 2 (P = 0.38); I^2 =0.0%							
Test for overall effect: Z = 3.04 (P = 0.0023)							
Test for subgroup differences: Chi^2 = 0.08, df = 1 (P = 0.78), I^2 =0.0%							



Analysis 1.26. Comparison 1 Culturally tailored HE compared to conventional or usual diabetes health care, Outcome 26 Final mean knowledge (diabetes and nutrition knowledge) at up to three months.

Review: Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups

Comparison: 1 Culturally tailored HE compared to conventional or usual diabetes health care

Outcome: 26 Final mean knowledge (diabetes and nutrition knowledge) at up to three months

Study or subgroup	Intervention N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Weight	Std. Mean Difference IV,Fixed,95% CI
Agurs-Collins 1997	31	14.8 (2)	27	13.3 (2.2)		11.6 %	0.71 [0.17, 1.24]
Anderson 2005	106	3.43 (0.73)	86	2.83 (0.82)		37.9 %	0.77 [0.48, 1.07]
Brown 2002	117	41.44 (5.13)	100	39.1 (5.75)		45.3 %	0.43 [0.16, 0.70]
Rosal 2005	15	0.59 (0.15)	10	0.62 (0.12)		5.1 %	-0.21 [-1.01, 0.59]
Total (95% CI)	**269**		**223**			**100.0 %**	**0.56 [0.38, 0.74]**

Heterogeneity: $Chi^2 = 6.74$, df = 3 (P = 0.08); I^2 =55%

Test for overall effect: Z = 6.04 (P < 0.00001)

Test for subgroup differences: Not applicable

Analysis 1.27. Comparison 1 Culturally tailored HE compared to conventional or usual diabetes health care, Outcome 27 Final mean knowledge (diabetes and nutrition knowledge) at up to six months.

Review: Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups

Comparison: 1 Culturally tailored HE compared to conventional or usual diabetes health care

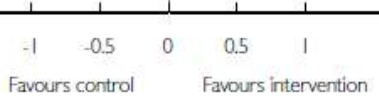
Outcome: 27 Final mean knowledge (diabetes and nutrition knowledge) at up to six months

Study or subgroup	Intervention N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Weight	Std. Mean Difference IV,Fixed,95% CI
Agurs-Collins 1997	30	14.1 (2.6)	25	13.3 (2.3)		12.0 %	0.32 [-0.21, 0.85]
Baradaran 2006	44	15.3 (4.7)	36	14.7 (4.1)		17.7 %	0.13 [-0.31, 0.57]
Hawthorne 1997	106	71 (11.03)	86	59.5 (16.09)		38.9 %	0.85 [0.55, 1.14]
Keyserling 2002	60	10.5 (3.1)	58	9.6 (3.05)		26.1 %	0.29 [-0.07, 0.65]
Rosal 2005	15	0.59 (0.15)	10	0.61 (0.12)		5.3 %	-0.14 [-0.94, 0.66]
Total (95% CI)	**255**		**215**			**100.0 %**	**0.46 [0.27, 0.65]**

Heterogeneity: $Chi^2 = 11.86$, df = 4 (P = 0.02); $I^2 = 66\%$

Test for overall effect: Z = 4.86 (P < 0.00001)

Test for subgroup differences: Not applicable



Analysis 1.28. Comparison 1 Culturally tailored HE compared to conventional or usual diabetes health care, Outcome 28 Final mean knowledge at one year.

Review: Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups

Comparison: 1 Culturally tailored HE compared to conventional or usual diabetes health care

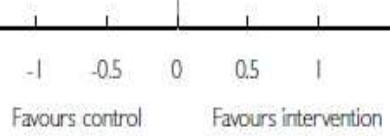
Outcome: 28 Final mean knowledge at one year

Study or subgroup	Intervention N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Fixed,95% CI	Weight	Std. Mean Difference IV,Fixed,95% CI
Brown 2002	110	42.94 (4.87)	107	40.92 (4.87)		65.8 %	0.41 [0.14, 0.68]
Keyserling 2002	54	10.7 (2.2)	57	10.1 (3.02)		34.2 %	0.22 [-0.15, 0.60]
Total (95% CI)	**164**		**164**			**100.0 %**	**0.35 [0.13, 0.57]**

Heterogeneity: $Chi^2 = 0.65$, df = 1 (P = 0.42); $I^2 = 0.0\%$

Test for overall effect: Z = 3.13 (P = 0.0017)

Test for subgroup differences: Not applicable



4. Summary & Suggestion

- **Outcome of Diabetes Education**
  - Type of Diabetes Education
  - RCT : Research design
  - Time of measure : 3M, 6M, 1year
  - Measurement of short, long term effect
  - Data registration

Health Outcomes and Measurement Methods of Diabetes Care

Thank you for your attention

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