

Changing Community Culture to Decrease Obesity and Diabetes

Translating Science to Action in Brownsville



Joseph B. McCormick, MD

Regional Dean

**The University of Texas School of Public Health,
Brownsville Campus**

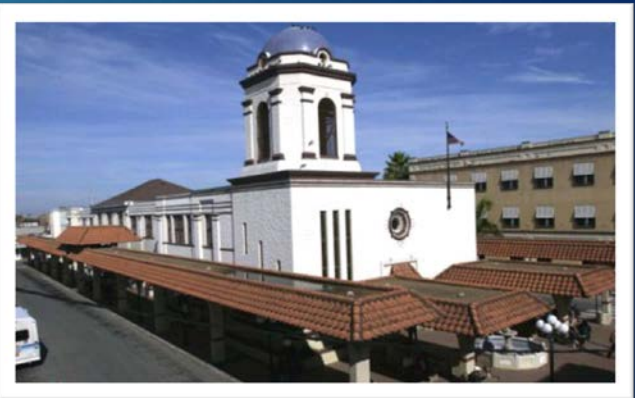
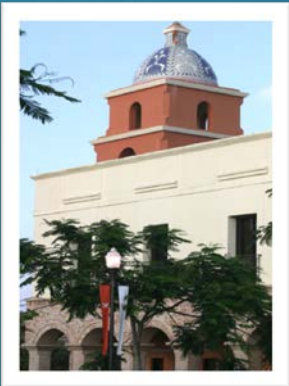


The Story of Brownsville, TX:

Model for an Emerging
Healthy Community



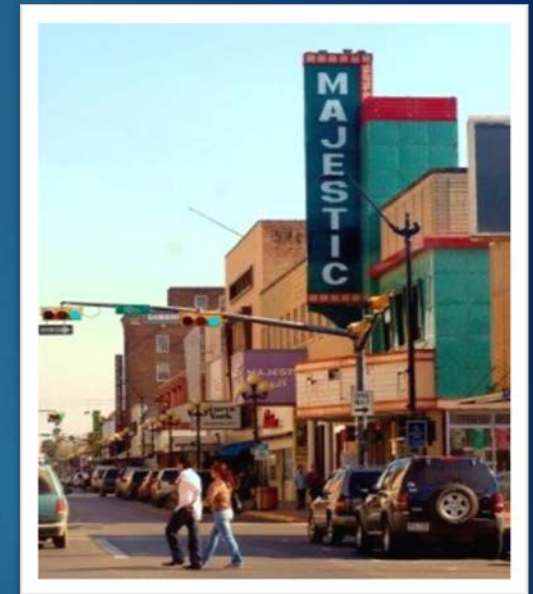
BROWNSVILLE, TX



Beautiful People and Wildlife



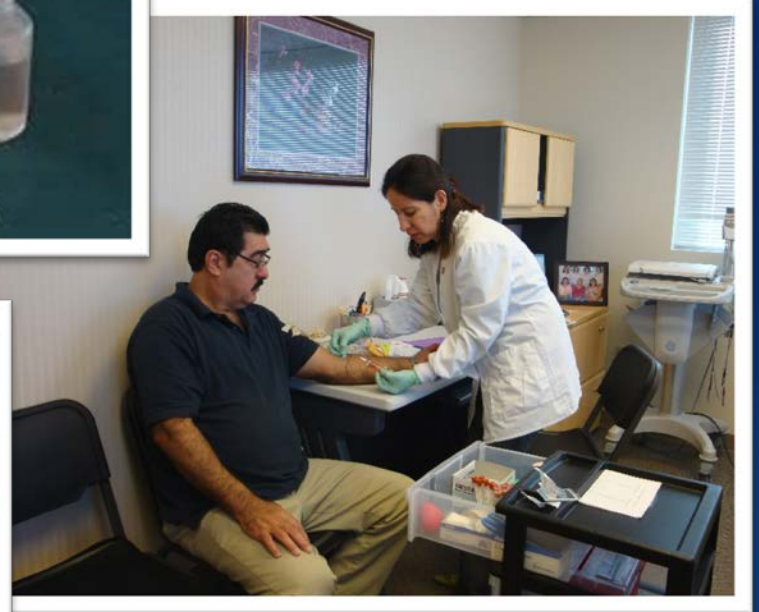
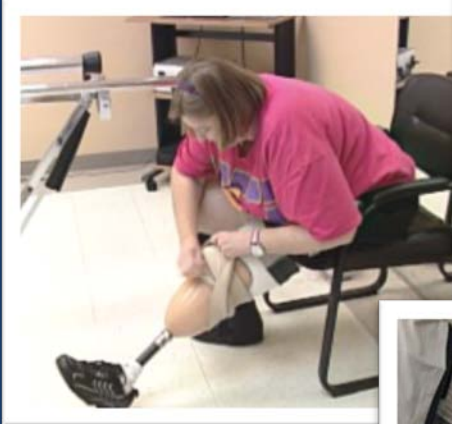
Urban and Rural Areas



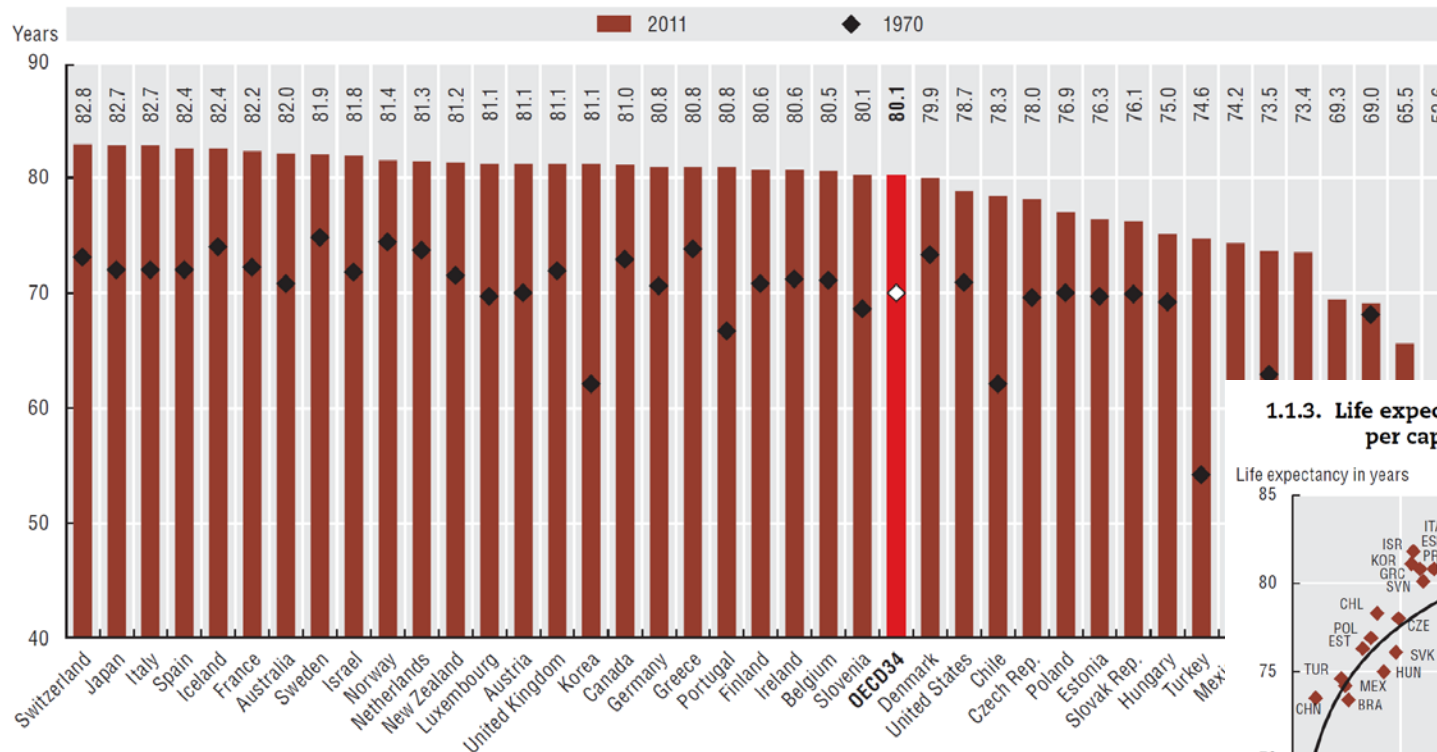
And Obesity



And Diabetes



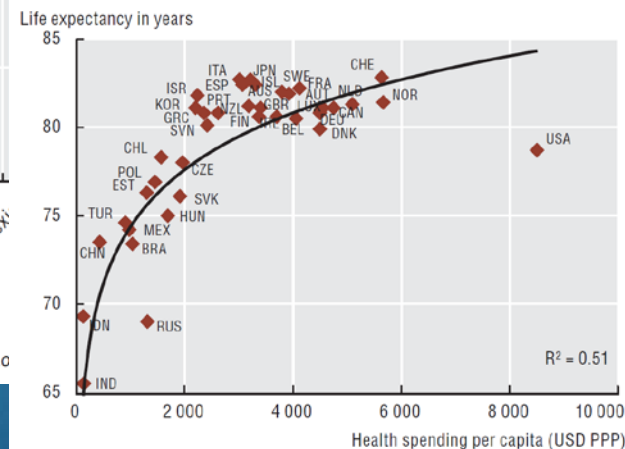
1.1.1. Life expectancy at birth, 1970 and 2011 (or nearest year)



Source: OECD Health Statistics 2013, <http://dx.doi.org/10.1787/health-data-en>; World Bank for non-OECD countries.

StatLink <http://dx.doi.org/10.1787/health-data-en>

1.1.3. Life expectancy at birth and health spending per capita, 2011 (or nearest year)



Source: OECD Health Statistics 2013, <http://dx.doi.org/10.1787/health-data-en>; World Bank for non-OECD countries.

StatLink <http://dx.doi.org/10.1787/888932916040>

The Cameron County Hispanic Cohort

- ▶ Created to Measure:
 - ▶ The Burden of obesity and diabetes
 - ▶ Risk factors for obesity and diabetes
 - ▶ Access to health services
 - ▶ Conditions related to obesity and diabetes



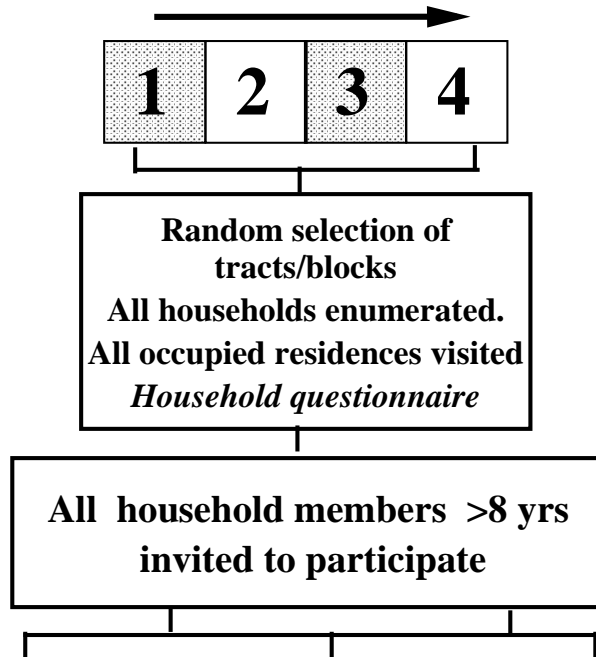
Cameron County Hispanic Cohort (CCHC n>3449)

A 'Framingham-like' cohort to measure the burden of obesity, diabetes, related conditions and disparities

Study design

2000/2010 Census:
Quartiles by mean
income (SES)

HOUSEHOLD



Questionnaire

Clinical exam

Laboratory

CLINIC VISIT

*Demographics
Socioeconomics
Medical History
Medications
Family History
Behavioral Factors
Anxiety/Depression*

*Anthropometry
Blood pressure/EKG
Carotid/Brachial/Liver ultrasound
ECHO cardiogram
DXA fat/bone densitometry
Cognitive Function
Retinal photography*

*Fasting blood for:
glucose/insulin/HbA1c
chemistries/hematology
genotyping
gene expression
cytokine/adipokes
immune responses
proteomics*

- Current activity**
- Ongoing recruitment
 - Pediatric cohort added 2014
 - 5-year follow up
 - Diabetes Risk Study
 - Cardiovascular disease
 - Liver disease
 - Mental Health
 - Intervention studies
 - Genetics
 - Immunology
 - Imaging
 - Clinical trials
 - Economics

**Now expanded to
Harlingen and Laredo
Clinical Research Units**



Recruitment, Data Collection & Management Clinical Research Unit

- Participants are recruited from randomly selected households by outreach research assistants. They are then invited to visit our Clinical Research Unit located in facilities kindly provided by Valley Baptist Medical Center, Brownsville
- Extensive examination and specimens collected and archived.



COLLABORATIVE TRANSLATIONAL RESEARCH MODEL



Community collaborations:

- Community Advisory Board: smoking policy, sidewalk policy etc.
- City Health Departments: Parks, trails, farmers' market, community gardens
- Healthy Community of Brownsville
- Multiple Businesses for Wellness programs
- Projecto Juan Diego (Community Based Participatory Research)
- 1115 waiver DSRIP program (8 projects)

Scientific collaborations:

- Cardiovascular diseases:
- Fatty liver disease:
- Diabetes and Depression:
- Diabetes and Cognitive Function:
- CTSA collaborations:
- UTHealth IMM/UTMB:
- UT Southwestern:

UTHealth Cardiology program
UTHealth Gastroenterology, UCSD
UTHSCSA
UTHealth Neurology
Clinical trials, shared databases
Biomarkers, bioinformatics
Metabolic and Nutritional studies



Cameron County Hispanic Cohort, Aug. 2015

TOTAL ADULT PARTICIPANTS RECRUITED	3,449
❖ Brownsville	2963
❖ Harlingen	282
❖ Laredo	204
❖ PEDIATRIC COHORT (8-17 years)	104
TOTAL FOLLOW-UP VISITS	1414
❖ 5 Year Follow up (in addition to DRS)	921
❖ 10 year Follow up (started June 15 th .)	122
❖ Deaths identified	92
NESTED STUDIES	
❖ Diabetes Risk Study (completed)	311
❖ Carotid ultrasound	755
❖ ECHO Cardiograms	264
❖ Liver Ultrasound	674
❖ DXA studies (started Sept 2014)	296



General characteristics of the cohort adults

	Total (n=2600) Mean (SE)
Mean age in years*	45.3 (0.8)
Annual income	\$18,598 (\$1,014)
Years education	10 (0.13)

The population is young, low income and limited education.

66.5% of the participants were born in Mexico.

CAMERON COUNTY HISPANIC COHORT

Diabetes and Metabolic Diseases

Prevalence of Chronic Disease Conditions Cameron County Hispanic Cohort (n=2792)

Chronic Condition	Numbers with condition	Weighted Prevalence	Proportion undiagnosed
Diabetes	773/2690	28.7%	56.2%
Hypertension	858/2790	31.0%	14.9%
Hypercholesterolemia	1313/2701	50.1%	44.7%
Proportion with 1 or more condition	1815/2714	68.3%	

Pre-Diabetes

30.4%

*Fisher-Hoch, Vatcheva, Hanis, McCormick et al 2012 PCD
Fisher-Hoch, Vatcheva, Rahbar, McCormick 2015, PlosOne*

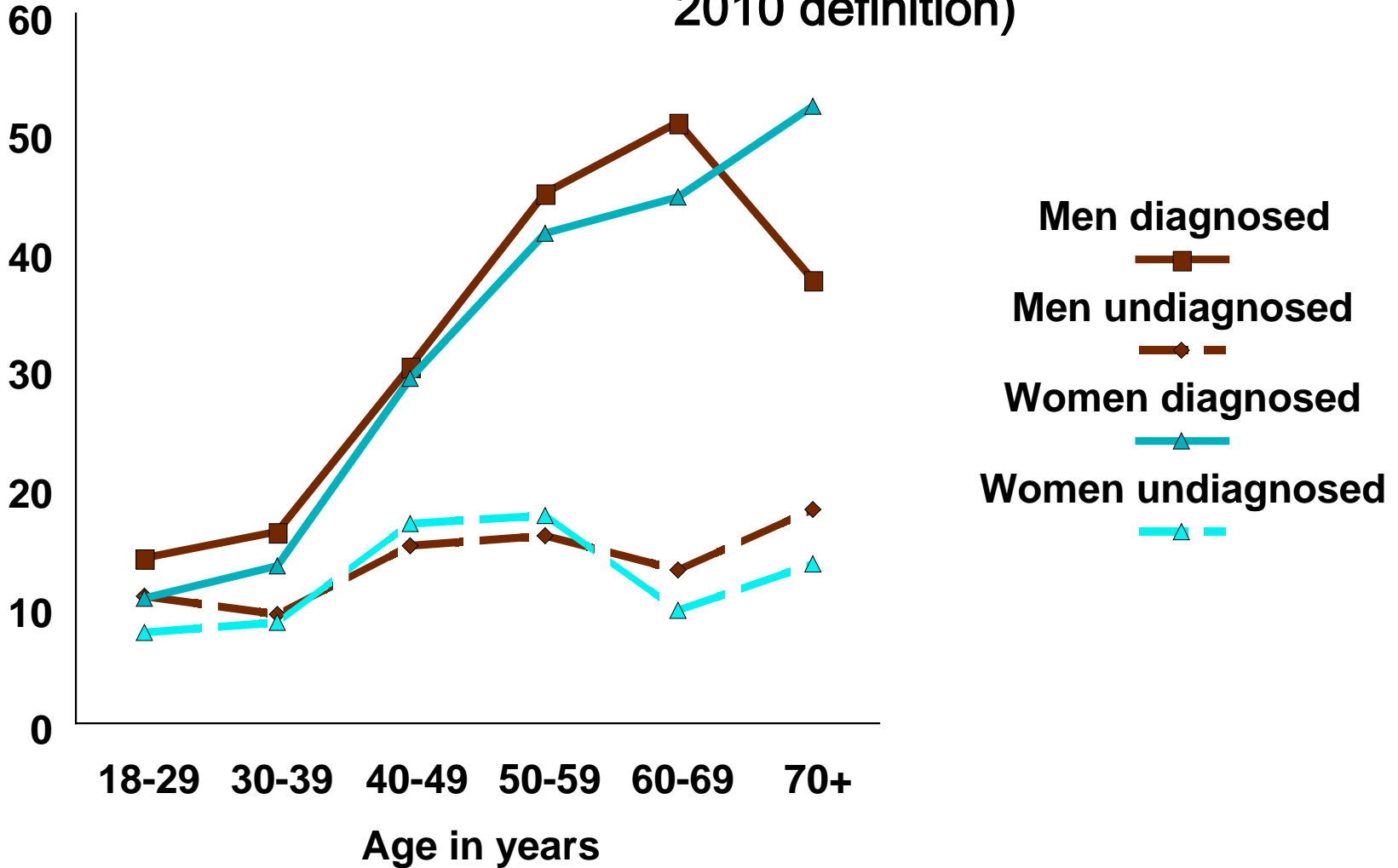


Cameron County Hispanic Cohort

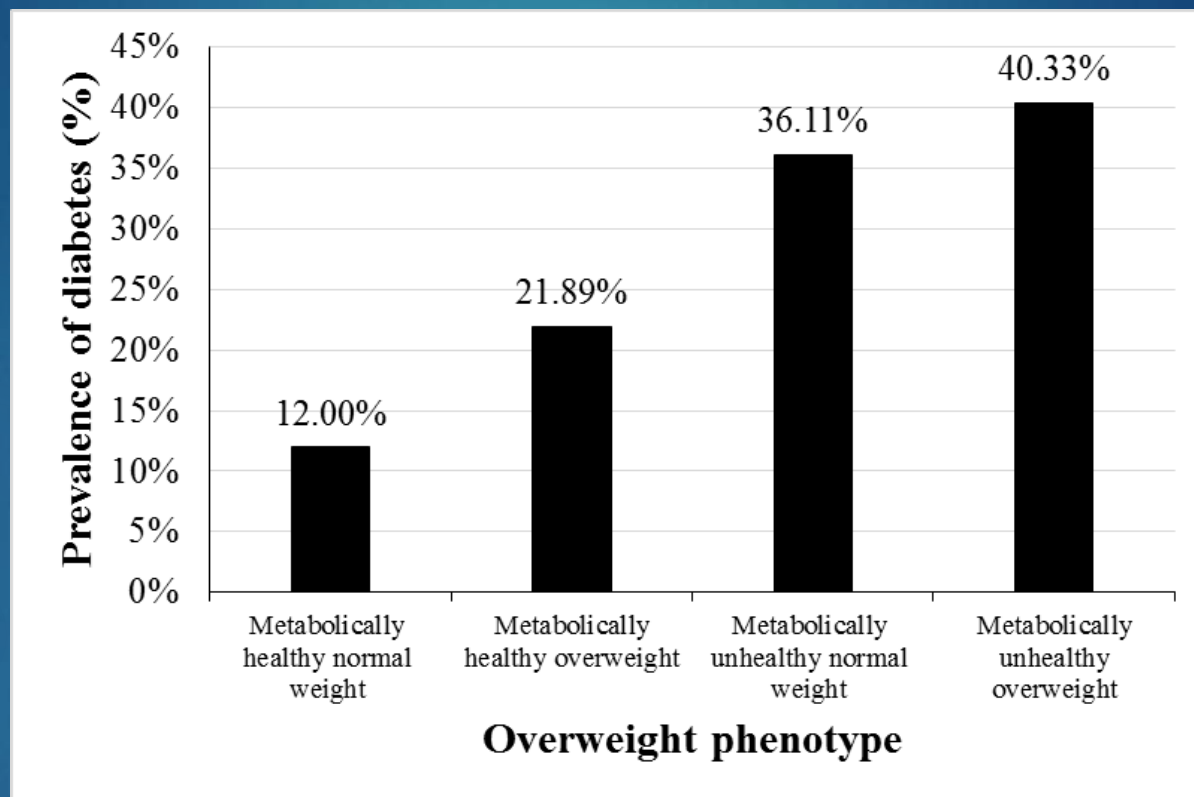
(males n=906, females n=1773)

Percent with diabetes by age and gender (2010 definition)

Percent

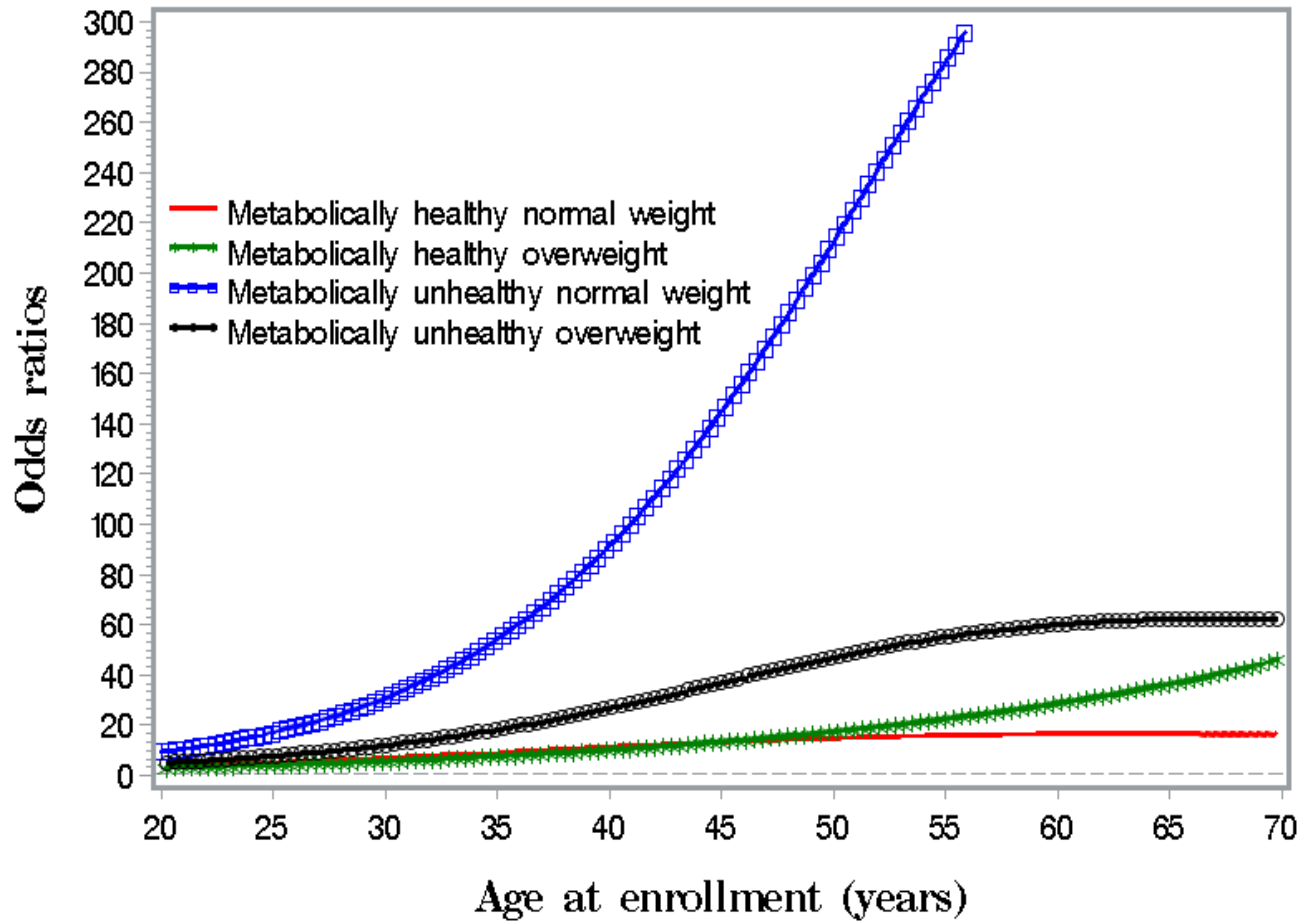


Obesity, Metabolic Health and Diabetes in the CCHC



Message: Type 2 diabetes is not just about obesity. Family History and metabolic health are key risk factors

Obesity, Metabolic Health and Diabetes in the CCHC





Self-reported medical histories and diabetes

Participants with diabetes have higher rates of many complicating diseases

	All participants (n=2000) n (%)	Diabetes 2010 (n=593) n (%)	RR (95% CI) diabetes vs no diabetes
Heart attack	45 (2.3)	26 (4.4)	1.82 (0.97, 3.39)
Stroke	44 (2.2)	27 (4.6)	2.40 (1.27, 4.53)
High blood pressure	505 (25.3)	239 (40.3)	1.61 (1.43, 2.29)
High cholesterol	489 (24.5)	211 (35.6)	1.56 (1.24, 1.96)
Gallbladder surgery	247 (12.4)	100 (16.9)	1.33 (0.99, 1.79)
Neuropathy	815 (40.8)	277 (46.7)	1.31 (1.07, 1.61)
Glaucoma	79 (4.0)	47 (7.9)	2.06 (1.27, 3.35)

Message: Follow newly diagnosed diabetes patients for quality of control and complicating conditions

CAMERON COUNTY HISPANIC COHORT

**Rates of Diagnosis, Treatment
and Health Insurance**



Distribution of health insurance types among CCHC participants by sex and age

Category	Insurance status			
	All types insurance %	Private insurance %	Medicaid %	Medicare %
All Participants	31.4	11.9	8.3	11.0
Males (n=657)	36.0	14.4	8.5	13.0
Females (n=1343)	27.7	9.9	8.2	9.4
18-64 years (n=1788)	20.4	13.8	4.6	1.8
≥65 years (n=212)	87.8	2.0	27.4	58.4

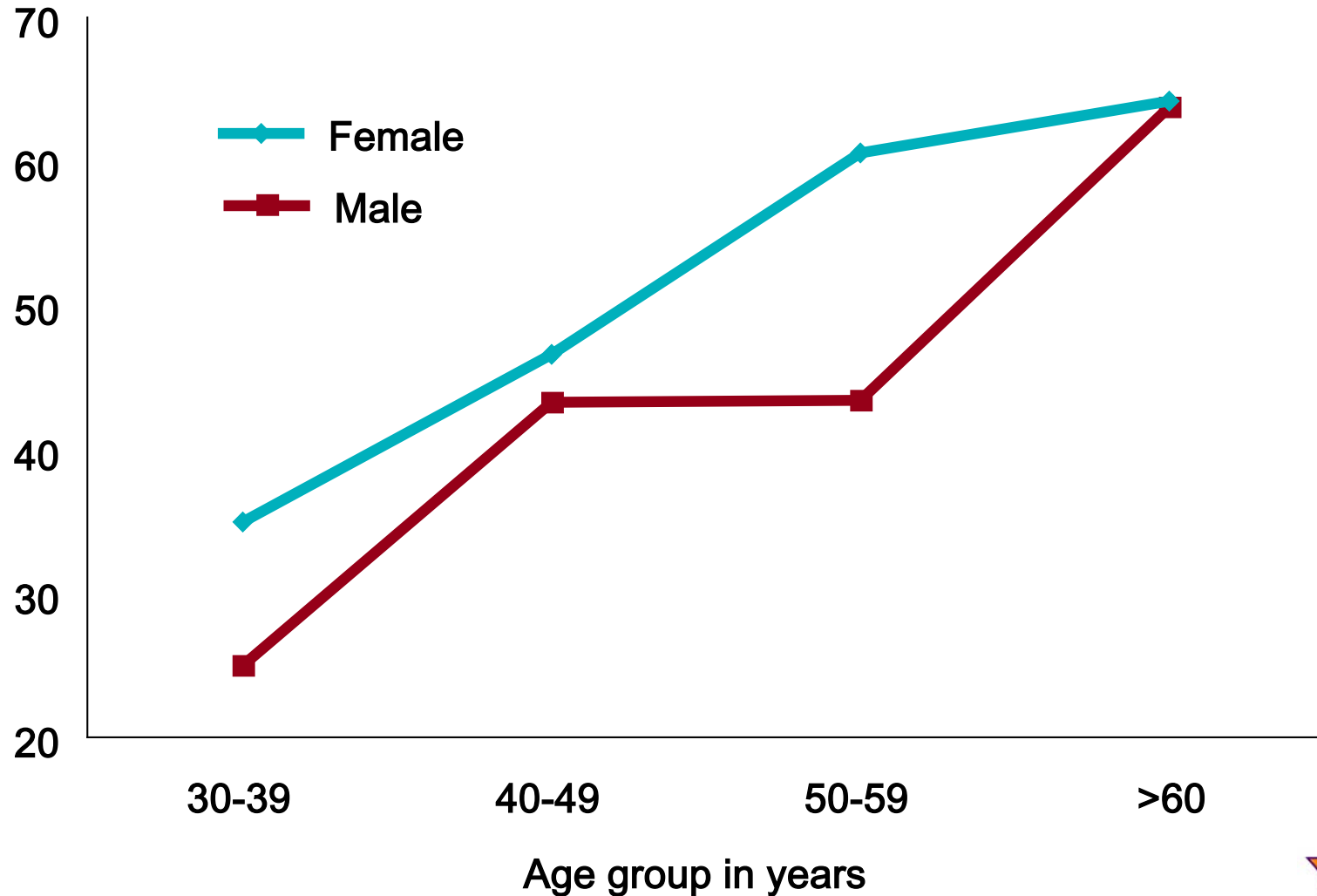
Fisher-Hoch, Vatcheva, Rahbar, Brown, McCormick et al. 2012 PCD



Summary: Appropriate medication for chronic disease and insurance (weighted prevalence and RR)

Indication	With Disease	With Disease on Medications	RR (95%CI) of the uninsured NOT receiving medication among ALL with disease
Diabetes	593		1.37 (1.13, 1.67)
Self-reported	221	122 (53.5%)	
Undiagnosed	372 (62.7%)	0	
Hypertension	633		1.83 (1.45, 2.31)
Self-reported	259	184 (65.2%)	
Undiagnosed	374 (59.0%)	0	
Hyperlipidemia	968		2.04 (1.48, 2.80)
Self-reported	215	91 (68.7%)	
Undiagnosed	753 (81.9%)	0	

CCHC: Female diabetes patients are more likely to be on medication than males



CAMERON COUNTY HISPANIC COHORT

Diabetes Economic Analyses

Dollar output reductions related to employment and productivity losses associated with diabetes Rio Grande Valley 2007

	Brown Model 1	Brown Model 2	Bastida & Págan model 3	Model 1 & 3
Direct income reduction	\$99,867,375	\$83,129,063	\$66,622,278	\$166,489,653
Indirect and induced output reduction	\$36,600,666	\$30,466,197	\$24,416,579	\$61,017,245
Total output reduction	\$136,468,041	\$113,595,260	\$91,038,857	\$227,506,898

Brown et al DIABETES CARE, VOLUME 28, NUMBER 12, DECEMBER 2005



Economic analyses by H. Shelton Brown III et al.

Effect of controlling blood sugar levels (HbA1c) in the workplace and on wages.

- **Diabetes itself affects working and wages regardless of diabetes control.**

**Message:
Prevention is more effective than cure.**

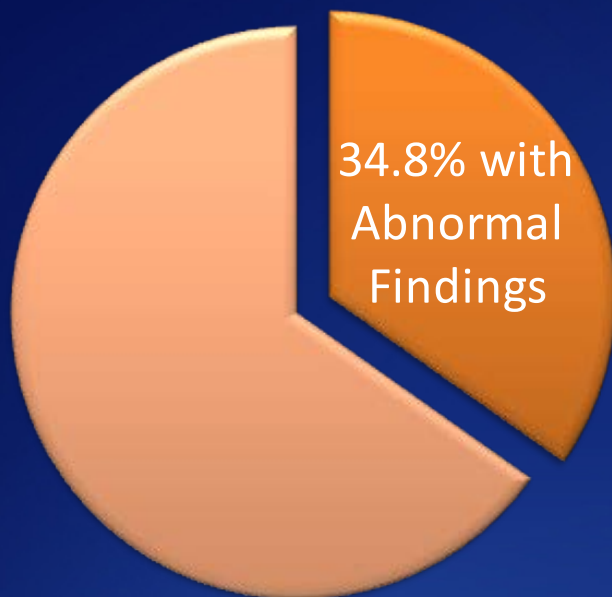
Cameron County Hispanic Cohort: Diabetes, tuberculosis, pneumonia, influenza

- ▶ Diabetes is a risk factor for TB in South Texas and Globally
 - ▶ Nearly 30% of TB cases are attributable to diabetes
 - ▶ Globally diabetes is becoming a threat to TB control because of the epidemic of diabetes in TB endemic countries
- ▶ **Diabetes and Obesity are high risk factors for bacterial pneumonia and for severe influenza**

Cameron County Cohort

Cardiovascular Disease

Subclinical Atherosclerosis



34.8% have
abnormal
carotid findings
on ultrasound

Laing et al, Echocardiography 2012; 29: 1224-1232.

CAMERON COUNTY HISPANIC COHORT

Cardiovascular disease

- ▶ In Mexican-Americans, cardiometabolic risk has a greater effect on early atherosclerosis development than body mass index.
- ▶ Non-obese but metabolically unhealthy participants had similar development of subclinical atherosclerosis as their obese counterparts.
- ▶ Interventions to maintain metabolic health among obese and non-obese patients may be a more important goal than weight loss alone

- ▶ Laing et al J Am Heart Assoc. 2015;4:e001540 doi: 10.1161/JAHA.114.001540

CAMERON COUNTY HISPANIC COHORT

Depression and Anxiety

- ▶ About half of cohort participants with diabetes are newly diagnosed in the Clinical Research Unit
- ▶ Those who report they have diabetes are very significantly more likely to be depressed than those newly diagnosed with diabetes
- ▶ Those with newly diagnosed diabetes have no more signs of depression than those without diabetes. *
- ▶ Obesity is also highly correlated with depression in the cohort **

- ▶ Depression is highly correlated with the level of diabetes control with significantly more signs of depression in those with higher HbA1c. So not attending to depression appears to significantly affect the quality of control of diabetes in the cohort.

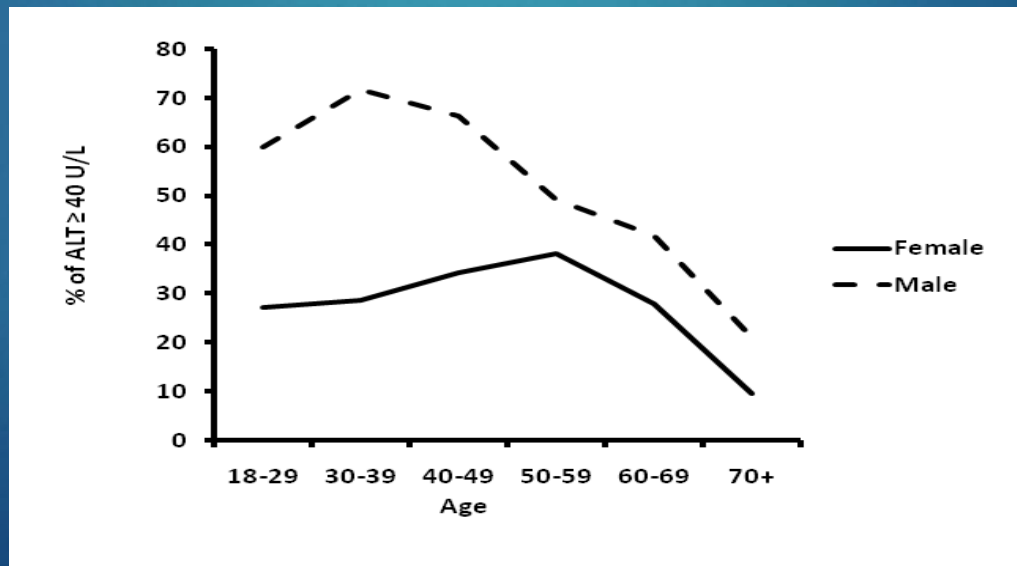
- ▶ * Olvera, R et al. In Press ** Olvera, R et al In Press
- ▶ & Kendzor D, et al. BMC Public Health 2014

CAMERON COUNTY HISPANIC COHORT

Liver Disease

- ▶ The RGV has one of the highest rates of chronic liver disease and liver cancer in the US.
- ▶ The major contributor appears to be obesity leading to cirrhosis. Liver failure and liver cancer.
- ▶ Younger men appear to be at particularly high risk.
- ▶ Liver cancer is the 3rd most common cancer in men and 5th in women in the RGV.

Cameron County Hispanic Cohort Evidence of liver injury (ALT \geq 40)



Subjects with total minutes per week of moderate and vigorous/strenuous activity greater than 1,098 METs decreased cancer risk by 95% [odds ratio (OR)=0.05; 95% confidence interval (CI): 0.005-0.54],

subjects who met physical activity guidelines of 150 moderate and vigorous minutes per week (\geq 600 METs) reduced their risk for cancer by 83% (OR=0.17; 95% CI: 0.05-0.76),

All after adjusting for age, gender, body mass index, smoking and alcohol drinking status, education and total portions of fruit and vegetable intake.

Conclusions: Increased moderate and vigorous physical activity significantly reduced the risk for cancer in Mexican-Americans.

Poor health outcomes in young Mexican American men (age 18-35, N=282)

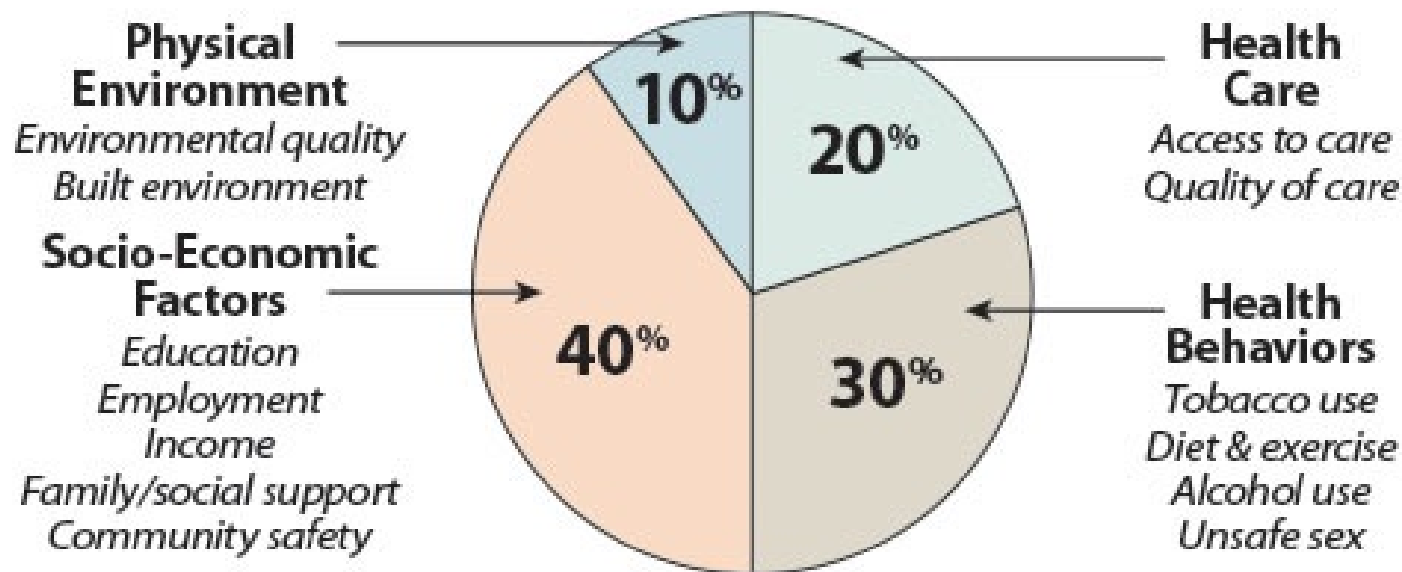
Age	44.3
Place of Birth	
US	48.0%
Mexico	50.4%
Completed High School	58.3%
No Insurance	63.6%
Obese (BMI > 30)	49.9%
BMI	30.9
Elevated Liver Enzymes	64.4%
Diabetes Categories	
Pre-Diabetes	37.3%
Diabetes	26.8%
Hypertension	33.9%

Summary of Disease and Disparities

- ▶ Diabetes and Obesity in our population are higher than most other areas of the US.
- ▶ Half of those with diabetes are undiagnosed primarily because of lack of health insurance therefore no access to health services.
- ▶ Only half of those who report having diabetes are under treatment
- ▶ Underlying heart disease and liver disease, and other manifestations of diabetes are extremely prevalent but undiagnosed.
- ▶ Diabetes underlies over 60% of hospital admissions for congestive heart failure, over 90% for renal disease, and nearly 100% for amputations.
- ▶ High costs of diabetes found in our population because of high prevalence, advanced disease because of lack of access.

Social Determinants of Health

Population Health



Source: Authors' analysis and adaption from the University of Wisconsin Population Health Institute's *County Health Rankings* model ©2010, <http://www.countyhealthrankings.org/about-project/background>

Community Advisory Board

- ▶ Community based participatory research approach
- ▶ Large and active community advisory board
 - ▶ Over 10 years old
- ▶ Every major employer in Brownsville participates and have created internal wellness programs
- ▶ Health Champion Awards
- ▶ Support policy changes programs



Implementation Timeline of Components of Community-Wide Campaign

2003 - 2005

- Community advisory board established
- Quantitative and qualitative needs and baseline assessment
- Daily TV morning show segments begin
- TV news segments begin
- Distribution of monthly newsletters begin
- Community health worker outreach begins

2006 - 2007

- TV news segments end (2006)
- TV morning show segments become weekly
- Weekly newspaper articles begin in Spanish and English in largest Brownsville city newspaper (2007)

2008 - 2009

- Surveys of CWC exposure begins with cohort (2008)
- Farmers' Market begins (2008)
- Spanish radio segments begin airing on 3 stations at drive time hours (2008)
- Walking trail in low income neighborhood
- Free exercise classes begin in partnership with community organizations

2010 - 2011

- TSSC website launched
- Brownsville's Biggest Loser annual events begins (2010)

2012 - 2014

- Weekly newspaper articles begin in English in neighboring city largest newspaper (2012)
- CycloBia quarterly events begin (2012)
- Better Block Events (2012)
- Community gardens begin (2013)
- TSSC Facebook (2013)

Community-Wide Campaign

- ▶ “...large-scale campaigns deliver(ing) messages that promote physical activity by using all **media** and even trailers in movie theaters. Multiple components that include **individually focused efforts** such as support and self-help groups; physical activity counseling; risk factor screening and education at worksites, schools, and community health fairs; and **environmental and policy change activities** such as community events and the creation of walking trails.”

Your Health Matters!

Tu Salud ¡ Si Cuenta!



Mass Media: TV, Radio & Print



- ▶ **TV:** Channel 7 Vallevisión broadcasts every Thursday morning segment featuring role models, experts, cooking & exercise demonstrations. Reaches audience of over 20,000.
- ▶ **TV:** The City of Brownsville and the Brownsville Independent School District's channels promote & cover events.



- ▶ **Radio:** Segments are presented daily across three popular Spanish language stations:



- ▶ **Newspaper:** A weekly health column reaches 19,000 every Sunday—focusing on policy and environmental changes.






Individually-Focused Activities

FREE Community-Wide Exercise Classes





Our stories better told by role models than by experts

“Before I came to the exercise class, I had high blood pressure and my sugar was out of control. I had never exercised. At the walking group the other women encouraged me and even called me if I didn’t come. I realized by moving even a little bit more each day I have more energy and feel better! Now the doctor says I don’t have to take medication any more because I am controlling my diabetes with the changes I have learned through the walking group. My blood pressure is down too!”

(Rosa, Brownsville)

FREE Nutrition Classes



Health Screenings



Texas 1115 Waiver DSRIP Program



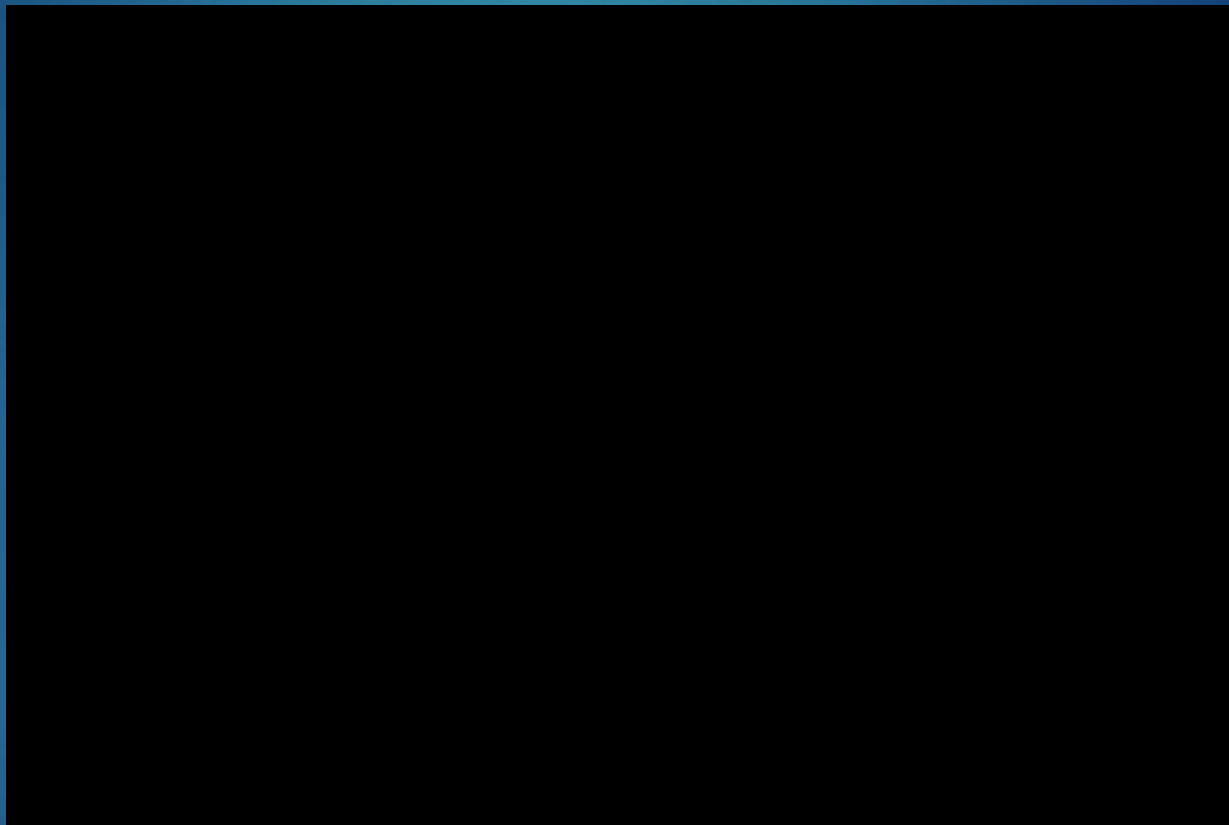
The UTSPH Brownsville Campus has implemented 8 DSRIP programs in our Region 5

Implemented diabetes treatment and control services

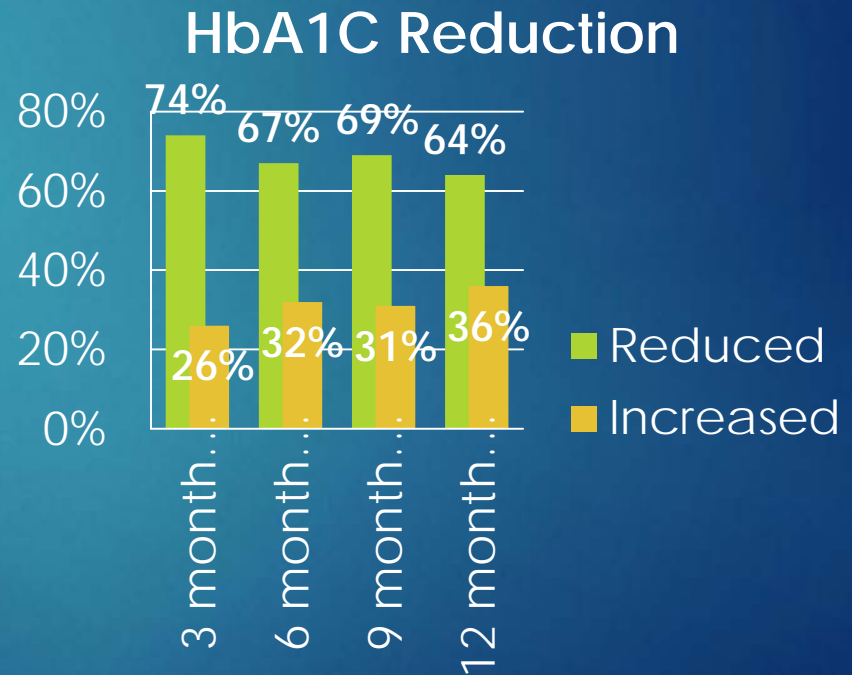
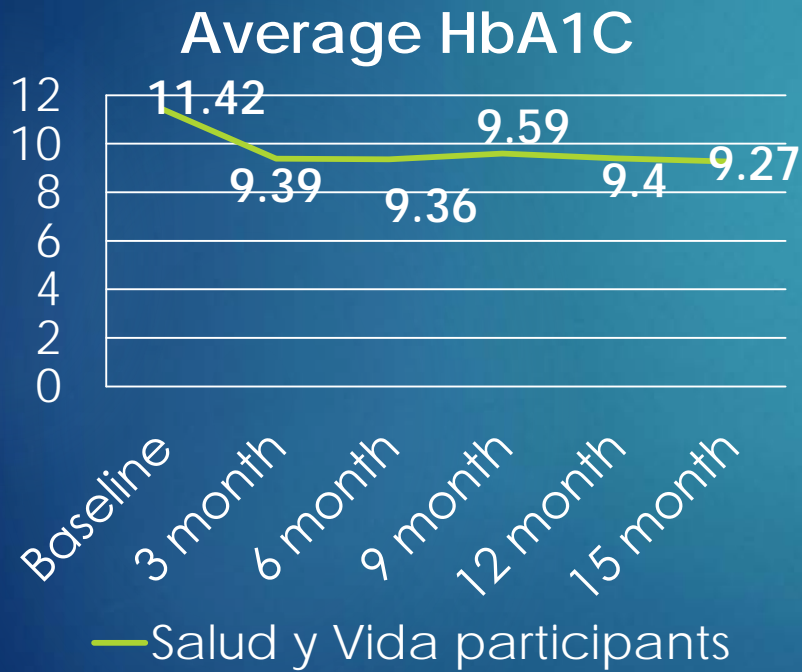
- ▶ Evidence based Wagner CCM model
- ▶ Regional partnerships for implementation
- ▶ Diabetes management program funded by 1115 waiver
- ▶ Served over 2000 clients
- ▶ Free DSME education
- ▶ CHW home visits
- ▶ Case management review
- ▶ Re-engagement with medical home
- ▶ Referrals and services for behavioral health
- ▶ Results show average A1c decreasing



Video



HbA1C Metrics



Implemented Obesity Prevention Program



mind exercise nutrition do it!



- ▶ Evidence based program
- ▶ For youth and at least one family member
- ▶ Funded through private foundation and 1115 waiver
- ▶ Served over 200 families already
- ▶ Partnered with schools, churches for referrals
- ▶ Results show children maintaining weight and parents losing weight



Environmental and Policy Changes

Recent Efforts include:



Sidewalk ordinance....done



Complete streets ordinance.....done



Safe passingdone



Smoke free ordinance.....done



Bicycle/Pedestrian Coordinator.....in progress



Dedicated funds for bike/pedestrian infrastructure.....ongoing



Leveraging Dollars



Healthy concessions.....in progress

Brownsville Farmers' Market



- ▶ October 2008: Weekly Texas-certified farmers' market established
- ▶ Initial funding from Texas Department of State Health Services
- ▶ Local farmers sell produce, strict focus on healthy foods and produce
- ▶ Between 300 – 600 people attend each market
- ▶ **Over 80%** report eating more fruits and veggies and a wider variety of produce since shopping at market



CATCH Curriculum in Schools





- ▶ River Rockets Bike Ride; Free Yoga Class at Linear Park
- ▶ Healthy Communities, Bicycle to Recycle!
- ▶ Charro Days Fiesta 5k/1 mile run/walk
- ▶ BISD Mini-triathlon at Aquatic Center
- ▶ Brownsville Community Health Center Free Health Fair w/ karate demos
- ▶ PUB & HEB's FREE Cooking and Exercise Classes



Guinness World Records® Largest Zumba® Class: April 30, 2011 with 1223 participants



Guinness World Records® Largest Zumbatomic® Class: 383 Youth - April 28, 2012



Biggest Loser Challenge Results

	SPRING 2010	SUMMER 2010	SPRING 2011	SPRING 2012	SPRING 2013	SPRING 2014	TOTAL
LENGTH OF CHALLENGE	17 weeks	6 weeks	17 weeks	17 weeks	17 weeks	13 weeks	AS OF 4/7/2014
ALL PARTICIPANTS							
Number that registered	410	137	919	1,023	1,274	1,363	5,126
Number at final weigh-in	122	84	207	291	236	327	1,267
% that completed the Challenge	29.8%	61.3%	22.5%	28.4%	18.5%	24.0%	24.7%
Total lbs lost	939.8	613.4	2,030.1	2,388.3	1,892.7	2,289.9	10,154.2
% weight lost	4.1%	3.6%	4.7%	4.1%	3.8%	3.8%	4.01%
Average lbs lost at finale	7.7	7.3	9.8	8.2	8.0	7.0	8.2
% gained Weight	18%	8%	14%	16%	17%	15.0%	
% lost Weight	78%	89%	86%	84%	81%	83.5%	
No Change in Weight	4%	2%	0.5%	0.3%	1.7%	1.5%	

Shared Resources and Grant Finding Efforts

- ▶ Examined the City of Brownsville's (COB) grant funding efforts and compared it to other midsize cities.
- ▶ Today, the COB has a Grants Department that has secured in last 5 years \$8.5 million and leveraged \$1.5 million to get it.
- ▶ Community Advisory Board (CAB) Mini-Grants
- ▶ Public/Private Partnership Grants
- ▶ 1115 Waiver

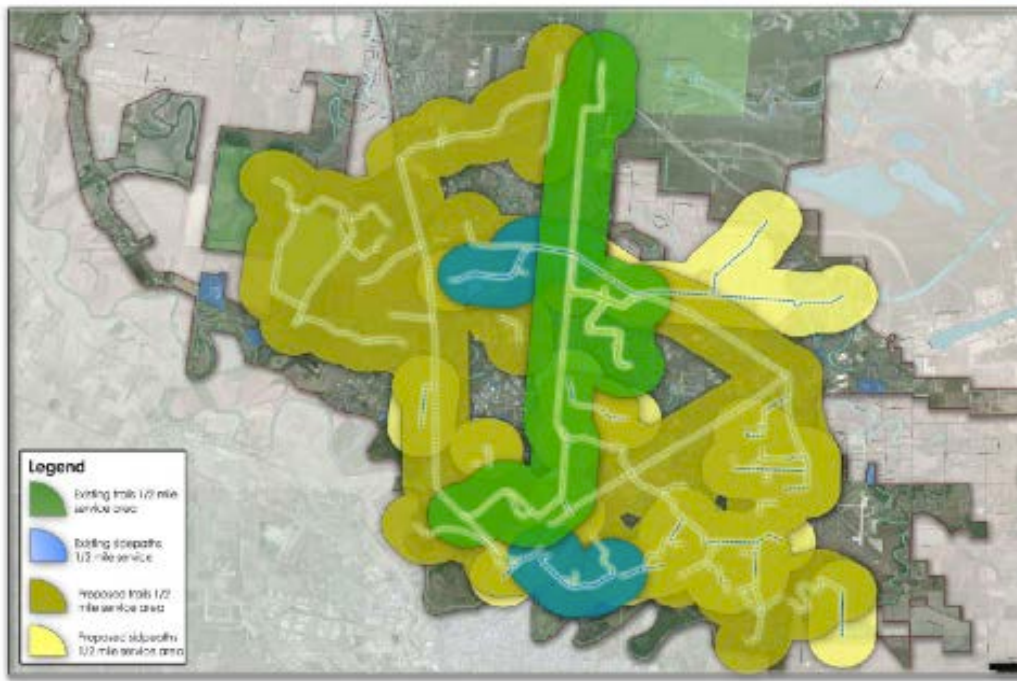
Community Gardens

- ▶ Grant awarded from Texas Department of Agriculture to the Brownsville Farmers' Market in Partnership with the City
- ▶ Now established six fully subscribed community gardens



City of Brownsville Award Winning Master Hike & Bike Plan

ULTIMATE PROXIMITY TO TRAILS AND SIDEPATHS



Miguel Roberts/The Brownsville Herald

Brownsville Police Chief Orlando Rodriguez, left, and Brownsville Fire Chief Lenny Perez ride down a bicycle trail near Ruben Torres Boulevard. They have joined a cycling group to stay fit and take advantage of Brownsville's bicycle trails.

CycloBia – Open streets family event to encourage physical activity



CycloBia – Open streets family event to encourage physical activity

Change in Physical Activity After Attending CycloBia Each Week



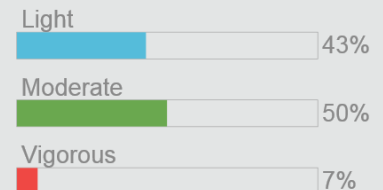
48% of respondents got MORE physical activity each week after attending CycloBia

- Got MORE physical activity (48%)
- Got the SAME physical activity (49%)
- Got LESS physical activity (3%)





Average amount of time attendees were physically active at CycloBia:

108 MINUTES

Intensity of that Physical Activity



Type of activity CycloBia attendees would be doing if they were not at CycloBia on June 6

- 73%  SEDENTARY ACTIVITY like sleeping, watching TV, on the computer or eating
- 13%  LIGHT ACTIVITY like yoga, fishing, bowling, golf, or easy walking
- 10%  MODERATE ACTIVITY like fast walking, baseball, tennis, or dancing
- 4%  VIGOROUS ACTIVITY like running, jogging, football, soccer or basketball

Brownsville, Texas:

Winner of 2014 Culture of Health Prize

Meet the *RWJF Culture of Health Prize* Winners



These six communities are beacons of hope and progress for healthier people and families. They were selected from more than 250 applicants, and are leading some of the nation's most innovative efforts to build a national Culture of Health.

<https://www.youtube.com/watch?v=-bOLx282R2c&feature=youtu.be>

The Approach Can be Replicated!

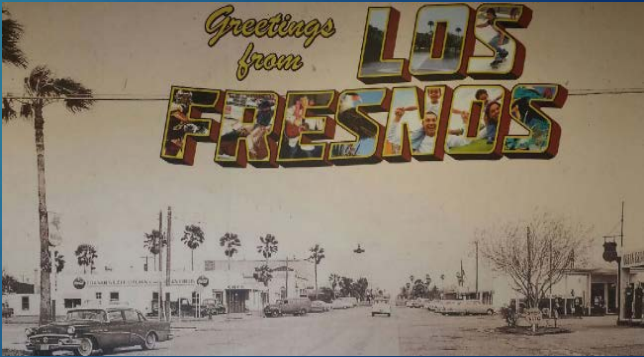
Town of Combes



City of Rio Hondo



Los Indios





Brownsville School of Public Health Campus

Research and Intervention Programs

Research PIs Susan Fisher-Hoch, Joseph McCormick, Belinda Reininger

Community Collaborators: Sister Phylis Peters, Dr. Rose Gowen, Art Rodriguez, and many many others.

Collaborators

UTHealth David McPherson, Susan Laing, Mike Fallon, JJ Pan, Bev Smulevitz, Nahid Rianon, Yutao Xi, Anna Wilkinson, Hossein Rahbar, Shelton Brown

MDAnderson K Schmeler, A Milbourne, S Black, L Beretta, E Baker

UCSD Ariel Feldstein

UTMB Jonathan Starkey, Bruce Luxon

UTHSCSA D Williamson, R Olvera, A Prassad, R Fajardo

South Texas DOI Sarah Williams-Blangero, J Blangero, M Johnson

BCM Joseph Petrosino, Kristy Murray