Tobacco Dependence & Diabetes

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Disclosure

Heather Dacus has no real or perceived vested interests that relate to this presentation nor does she have any relationships with pharmaceutical companies, biomedical device manufacturers, and/or other corporations whose products or services are related to pertinent therapeutic areas.

Objectives

- Recognize the increased risk of cardiovascular disease, microvascular complications and mortality among individuals with diabetes who also smoke
- Describe
  - The prevalence of smoking among individuals with diabetes
  - Specific characteristics of individuals with diabetes who smoke
- Encourage tobacco dependence treatment as a routine component of diabetes care

Leading Causes of Death

Table 1. Leading Causes of Death in the United States in 2000*

Cause of Death	No. of Deaths	Death Rate per 100 000 Population
Heart disease	710760	258.2
Malignant neoplasm	553 091	200.9
Cerebrovascular disease	167 661	60.9
Chronic lower respiratory tract disease	122 009	44.3
Unintentional injuries	97 900	35.6
Diabetes mellitus	69 301	25.2
Influenza and pneumonia	65 313	23.7
Alzheimer disease	49 558	18
Nephritis, nephrotic syndrome, and nephrosis	37 251	13.5
Septicemia	31 224	11.3
Other	499 283	181.4
Total	**2 403 351**	873.1

*Data are from Minino et al.[4]

Mokdad, et al (2004). Actual Causes of Death in the United States. *JAMA*. 291:1238-1245

Tobacco & Chronic disease

Table 2. Actual Causes of Death in the United States in 1990 and 2000

Actual Cause	No. (%) in 1990*	No. (%) in 2000
Tobacco	400 000 (19)	435 000 (18.1)
Poor diet and physical inactivity	300 000 (14)	400 000 (16.6)
Alcohol consumption	100 000 (5)	85 000 (3.5)
Microbial agents	90 000 (4)	75 000 (3.1)
Toxic agents	60 000 (3)	55 000 (2.3)
Motor vehicle	25 000 (1)	43 000 (1.8)
Firearms	35 000 (2)	29 000 (1.2)
Sexual behavior	30 000 (1)	20 000 (0.8)
Illicit drug use	20 000 (<1)	17 000 (0.7)
Total	**1 060 000** (50)	**1 159 000** (48.2)

*Data are from McGinnis and Foege.[1] The percentages are for all deaths.

Mokdad, et al (2004). Actual Causes of Death in the United States. *JAMA*. 291:1238-1245

Smoking & Diabetes

- Active smoking is *associated* with a 40% increased risk for Type 2 Diabetes
  - Dose related
    - Heavy (1.61) > light (1.29) > former smokers (1.23)
    - May be modifiable: stop smoking = decreased risk

- Not clear that smoking *causes* diabetes:
  - Smoking tends to be present with other unhealthy behaviors
  - Socioeconomic status, lack of physical activity, dietary habits and obesity are other important considerations.

Willi C. et al (2007). Active Smoking and the Risk of Type 2 Diabetes. *JAMA* 298(22):2654-2664

Individuals with diabetes who also smoke are at an increased risk of cardiovascular disease, microvascular complications and mortality.

Cardiovascular Disease Risk

- Risk factors for the development of CVD:
  - **Type 1 and Type 2 Diabetes**
  - **Tobacco use**
  - Hypertension
  - Low HDL cholesterol
  - Family history of premature CHD
  - Age (men ≥ 45, women ≥ 55)

Smoking & Diabetes

- Individually, each contributes to the development of micro- and macrovascular disease:
  - Retinopathy
  - Neuropathy
  - Nephropathy
  - Cardiovascular disease
  - Cerebrovascular disease
- Together, the risks for these complications increases.

Smoking & Diabetes

- Compared to non-smokers, individuals with diabetes who also smoke have:
  - Greater degree of insulin resistance
  - Higher total cholesterol and LDL, lower HDL
  - Poor glycemic control
  - Increased risk of:
    - Neuropathy
    - End stage renal disease
    - Nonproliferative retinopathy
    - Cardiovascular disease
    - Death from all causes (dose dependent)

Smoking & Diabetes

- Accelerated progression of microvascular disease (esp. nephropathy) even with ACEI use and blood pressure control.

- Adolescents who smoke and have diabetes are at 50 to 75% greater risk for morbidity/mortality in later life than those who do not smoke.

Chuahrin T et al (2002) Cigarette smoking predicts faster progression of type 2 diabetic nephropathy despite ace inhibition. *Am J Kid Dis* ;376
Tyc V et al.(2005) Smoking rates and the state of smoking interventions for children with chronic illness. :118: 471

Smoking & Diabetes

- Smoking decreases the subcutaneous absorption of insulin
  - Insulin dosing requirements increase
- Smoking is associated with central adiposity, hyperlipidemia & increased blood pressure
- Smoking is also associated with increased risk of severe hypoglycemia in type 1 patients.

Hirai F et al. Severe Hypoglycemia and Smoking in a long term type 1 dm population. Diabetes Care. 2007;1437.
Sherman J. The impact of smoking and quitting smoking on patients with diabetes. Diabetes Spectrum 2005;18: 202

The prevalence of smoking among individuals with diabetes

Prevalence

- Tobacco use among adults age 18 and older:
  - 24.1% in 1998 18.9% in 2007
  - A decrease of 22%

- Diabetes among adults age 18 and older:
  - 6% in 1998 8.2% in 2007
  - An increase of 27%

New York State Behavioral Risk Factor Surveillance System (1998-2007)

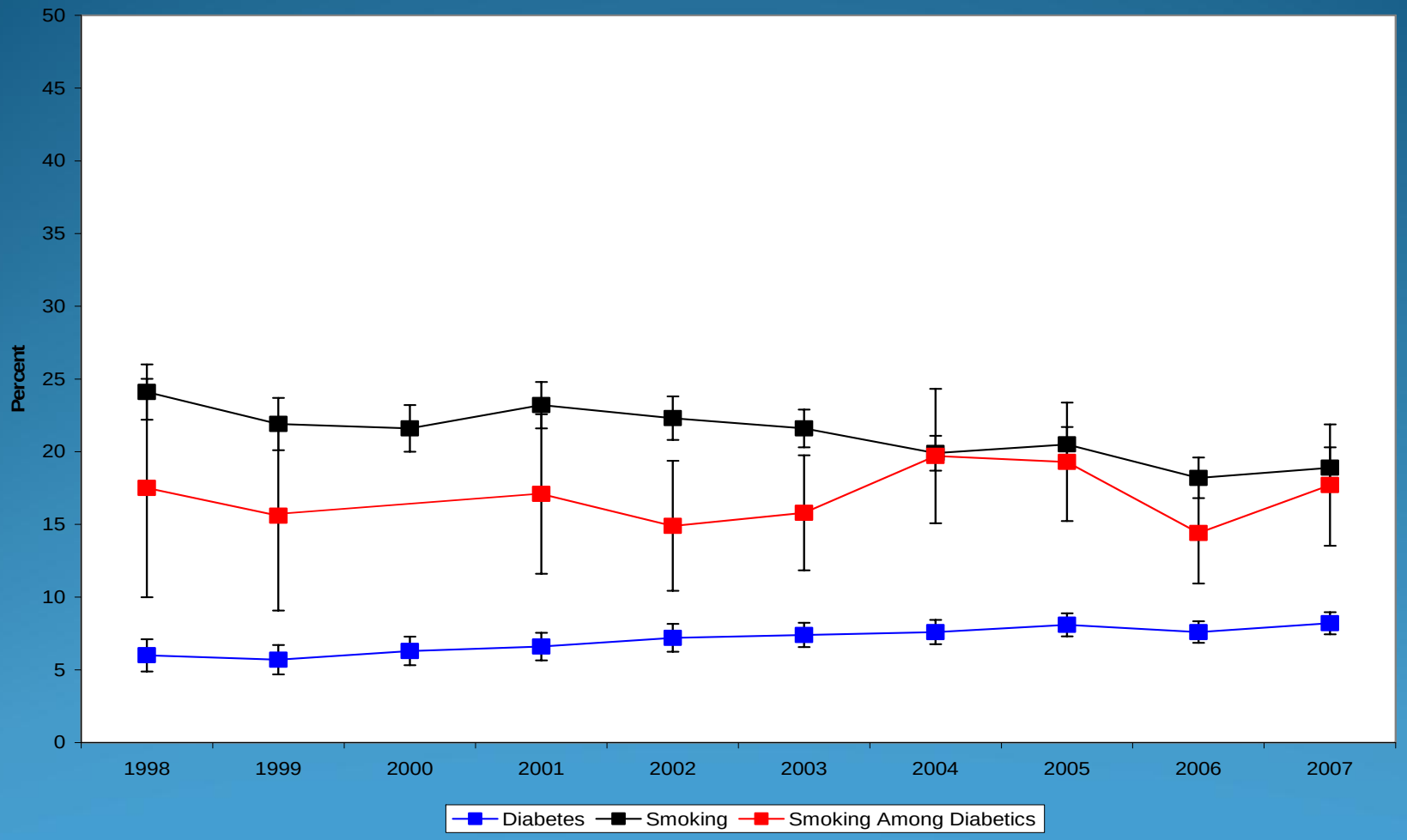
Percentage of Adult Smokers, Adults with Diabetes And Smoking among Those with Diabetes

- Despite the decreased prevalence of tobacco use in the general population, current smoking among persons with diabetes has remained stable since 1998.

- Close to 1 in 5 persons with diabetes currently use cigarettes.

New York State Behavioral Risk Factor Surveillance System (1998-2007)

Percentage of Adult Smokers, Adults with Diabetes And Smoking among Those with Diabetes



New York State Behavioral Risk Factor Surveillance System (1998-2007)

Patient Characteristics

Patient characteristics

- Lack of awareness of increased risk for CVD
  - NYS Adult Tobacco Survey 2003-2004 found only 77% of people with diabetes who also smoke noted smoking as a cause of CVD compared to 92.5% of people with diabetes who do not smoke.
- Often in precontemplation stage of readiness
  - Not planning to quit in next 6 months

Patient characteristics

- Likely to report feeling sad or depressed
- Concerned about weight management
- Less actively involved in diabetes self-care
  - Minnesota survey of health plan members with diabetes found those who smoked significantly less likely to be checking blood glucose frequently or exercising regularly

Solbert L et al (2004) Diabetic Patients Who Smoke: Are they Different? Annals of Family Medicine;2(1):26-32.

Patient characteristics

- Younger in age - 25-44 age group
- African American
- Lower education attainment.

Karter et al. Educational disparities in rates of smoking among dm adults. Am J Pub Health. 2008;98:365

Disparities in diabetes care

In past year	Diabetic Smoker	Diabetic Non-smoker	Significance
≥ 2 A1C tests	48.9%	57.4%	<0.001
≥ 2 foot exams	39.6%	47.8%	<0.001
Had dilated eye exam	60.9%	68.1%	<0.001
Received a flu shot	52.2%	62.8%	<0.001
Latest A1C value	8.2±2.2	7.7±2.0	<0.001

Hosler, et al (2007). Disparities in Diabetes Care Between Smokers and Nonsmokers. *Diabetes Care*: 30(7);1883-1885.

The Good News

- 80% of people with diabetes who also smoke noted being advised by their health care provider to stop smoking.*
  - Only 50.5% made a quit attempt.

* This is high in comparison to that which has been noted in other studies (50%).

2003-2004 NYS Adult Tobacco Survey as reported in Hosler, et al (2007). Disparities in Diabetes Care Between Smokers and Nonsmokers. *Diabetes Care*: 30(7);1883-1885.

Treating Tobacco Use & Dependence

2008 Update

U.S. Public Health Service Clinical Practice Guidelines

Key Messages

- **Prevention of tobacco use**
  - Advise all patients with diabetes not to initiate smoking
  - Repeat messaging may be particularly beneficial in adolescents
- **Treatment of tobacco dependence**
  - Make tobacco dependence treatment a routine part of diabetes care

Prevention of tobacco use

- Ask all patients with diabetes about tobacco use
  - Routine monitoring allows for opportunities to intervene
  - May be challenging with adolescents
- Provide age-appropriate educational materials
  - Inform patients with diabetes about the increased risk of complications
- Advise patients and families not to begin smoking
- Establish clinic settings that support a smoke-free environment

Treat Tobacco Dependence

- Treatment of both hypertension and tobacco dependence are key to reducing risk for macrovascular complications.
- Shift from solely focusing on glycemic control to also managing cardiovascular risk.
- Make tobacco dependence treatment one of the highest priorities in diabetes care.

NCQA standards

Diabetes Recognition Measure	Threshold (% patients in sample)
HbA1c > 9%	≤ 15%
HbA1c < 7%	40%
Blood pressure control ≥ 140/90	≤ 35%
Blood pressure control < 130/80	25%
LDL Control ≥ 130 mg/dl	≤ 37%
LDL Control < 100 mg/dl	36%
Eye examination	60%
Foot examination	80%
Nephropathy assessment	80%
Smoking status & Cessation Advice/Tx	80%

www.ncqa.org/dprp

American Diabetes Association

- The ADA position statement in 2004 recommends inclusion of prevention and cessation of tobacco use as an important component of clinical diabetes care.

- ADA Standards of Medical Care 2009 recommend:
  - Advise all patient to not smoke
  - Include smoking cessation counseling and other forms of treatment as a routine component of diabetes care.

5 A's

- ***Ask***
  - All members of the health care team are trained to inquire about the smoking status of all patients with diabetes.
  - Type of health care provider asking the question is not as important as asking consistently.
  - At every clinic visit

5 A's

- ***Advise***
  - All members of the health care team are trained to strongly encourage smokers to quit, and provide reasons for why this is beneficial to the person with diabetes.
  - Type of health care provider giving the message is not as important as giving the message consistently and emphatically.
  - At every clinic visit

5 A's

- ***Assess***
  - All members of the health care team are trained to inquire about a person's willingness to quit smoking at this time.
  - At every clinic visit

- Although people with diabetes who also smoke are more likely to be in precontemplation:
  - Those given advice to quit were further along in the stages of change.

Ruggiero et al (1999). Smoking and Diabetes: Readiness for Change and Provider Advice. *Addict Behav*;24:573-578.

If ready to quit

- ***Assist***
  - Provide with cessation counseling and support
    - ***Set a quit date.*** Ideally, the quit date should be within 2 weeks.
    - ***Tell*** family, friends, and coworkers about quitting, and request understanding and support.
    - ***Anticipate*** challenges to the upcoming quit attempt, particularly during the critical first few weeks. These include nicotine withdrawal symptoms.
    - ***Remove*** tobacco products from your environment. Prior to quitting, avoid smoking in places where you spend a lot of time (e.g., work, home, car). Make your home smoke-free.

If ready to quit

- ***Assist***
  - Discuss common behaviors associated with smoking and ways in which behaviors can be associated with new, healthier activities
  - Acknowledge weight management concerns
  - Acknowledge possible presence of depression or other mood disorder
  - Offer pharmacologic treatment if desired
  - Refer to additional services in the community to support behavior change

If ready to quit

- ***Arrange***
  - Close follow up soon after a set quit date to reinforce and support positive changes in behavior.
  - Remind patients of Quit Line support (1-866-NY-QUITS).
  - For patients who are abstinent
    - congratulate them on their success.
  - If tobacco use has occurred
    - review circumstances and elicit recommitment to total abstinence.
  - Anticipate potential noncompliance
    - Have clinic staff follow up on missed appointments.
    - Follow up via phone with those who plan to quit.

Not ready to quit?

- Don't give up - Help move them towards change:
  - ***Relevant*** reasons for quitting
  - ***Risks*** of continued smoking
  - ***Rewards*** of a smoke-free life
  - ***Roadblocks*** of successful quitting
  - ***Repetition*** to stress importance of quitting and availability of services when desired

Weight concerns

- Weight gain may occur as a result of smoking cessation:
  - NHANES data show an average of 4.4 kg for men and 5.0 kg for women
  - Major weight gain (>15kg) is not common
- Discourage smoking as a tool to maintain diabetic control:
  - Smoking has a negative effect on lipid profiles
  - Smoking increases insulin resistance

Modest weight gain in the short term is offset by the long term health benefits of cessation

Flegal et al (1995). The influence of smoking cessation on the prevalence of overweight. *NEJM*:333;1165-1170.

Presence of depression

- Compared to the general population, the prevalence of depression is higher in people with diabetes:
  - 14% vs. 3-4%
- Depression can interfere with successful cessation efforts
- Address and treat depressive symptoms, if present

Gavard et al (1993). Prevalence of depression in adults with diabetes. *Diabetes Care*:16;1167-1178.

Pharmacologic Interventions

- To date, studies have not focused specifically on individuals with diabetes who smoke.
  - Such individuals have been sub-populations in studies.
- Evidence does not promote one particular medication over another.
- All smokers trying to quit should be offered medication, if desired and appropriate.

Pharmacologic Interventions

- Nicotine Replacement Options:
  - Patch → provide a relatively stable blood nicotine level
  - Lozenge
  - Gum → increase nicotine levels rapidly to help with cravings
  - Inhaler
- Bupropion SR
  - May be particularly useful in individuals with depressive symptoms, or with concerns of weight gain.
- Varenicline
  - May not be the best option for individuals with depressive symptoms given the FDA warning issued in 2008.

AHRQ (2008). Treating Tobacco Use and Dependence. Available online at www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=hstat2.chapter.28163

Triple-combination pharmacotherapy

- 2009 RCT
- Enrolled 127 people with chronic medical problems who also smoke: 20 with diabetes
- Compared standard 10 week NRT protocol with a flexible duration, triple-combination protocol
- All received a limited behavioral intervention
- After 6 months abstinence rates:
  - 35% in combination group vs. 19% for patch only group
  - Discontinuation of treatment due to adverse events was similar between the two groups

Steinberg et al (2009). Triple-Combination Pharmacotherapy for Medically Ill Smokers. *Annals of Internal Medicine*;150:447-454

Efficacy of interventions

- Nurse-managed intervention vs usual care
  - RCT in Spain
  - 40 minute visit with nurse + optional NRT + follow up support
  - After 6 months, 17% intervention group had quit smoking compared to 2.3% usual care group (confirmed with urine cotinine)
  - There was also a significant decrease in the mean number of cigarettes smoked per day in the intervention group compared to usual care

Canga N. et al (2000) Intervention Study for Smoking Cessation in Diabetic Patients. *Diabetes Care* 23(10).

Efficacy of interventions

- Motivational Interviewing as part of Diabetes Self Management
  - RCT in Minnesota
  - Both groups received standard diabetes education.
  - Intervention group – above + 30 minute counseling session using motivational interviewing, 3-6 telephone counseling sessions and offer of NRT.
  - After 3 months – trend toward greater cessation with intervention, but not maintained after 6 months.
  - Addition of the intervention did not negatively impact other components of DSME.

Hokanson JM, et al (2006). Integrated Tobacco Cessation Counseling in a Diabetes Self-Management Training Program. *The Diabetes Educator*;32(4).

Efficacy of interventions

- Motivational Interviewing in group or telephone counseling sessions:
  - Intervention group invited to participate in 8 group sessions or telephone interview and follow up.
  - Usual care group sent a letter with advice to quit.
  - After 1 year – 20% cessation rate in intervention group vs. 7% in usual care group. (Not verified with cotinine levels)

Persson et al (2006). Smoking Cessation in Patients with Diabetes Mellitus: results from a controlled study. *Scand J Prim Health Care*; 24(2)75-80.

Environmental Changes

"Effective systems for implementing these guidelines should be incorporated into the routine practice of diabetes care."

ADA position statement, 2004

Environmental Changes

- A health care facility policy requires all diabetes health care providers to be trained on smoking cessation guidelines.
- Smoking status is recorded as a vital sign on all clinic patient records.
- Systems are instituted to routinely provide follow up contact to patients with diabetes who smoke, especially those who are noting a readiness to change.
- Materials provide education and information about resources for quitting smoking.

KanQuit

- Direct-to-smoker outreach strategy across 50 rural primary care practices in Kansas
- 2009 study enrolled 750 people (101 people with diabetes) who smoked more than 10 cigarettes per day:
  - Regardless of their willingness to quit
  - Randomized into three groups
- Over 24 months:
  - 75% of participants accepted at least 1 offer of medication
  - Across all groups, ~25% self-reported tobacco abstinence

Ellerbeck et al (2009). Effect of Varying Levels of Disease Management on Smoking Cessation. *Annals of Internal Medicine*;150:437-446.

Success

- Multiple quit attempts are likely before smoking cessation is maintained.
- Success may mean someone moves from being in precontemplation to contemplation.
- Don't quit just because they're not ready to quit.

Don't be silent about smoking.

Your patients are listening.

Special Considerations

- Creativity and close follow up
- Don't give up – move them towards change
- Anticipate potential noncompliance
- Acknowledge weight management concerns
- Be cognizant of the possible presence of depression or other mood disorder

Thank you!

Questions?