

# The Translational Research Institute on Pain in Later Life (TRIPLL) at Cornell University

- NIA funded Edward R. Roybal center established in response to the plight of millions of older adults experiencing persistent pain.
- Mission: To improve the prevention and management of pain in later life; thereby increasing the health and well-being of older adults.
- Supports translational research on aging and pain in greater NYC area.



# Get Involved with TRIPLL

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  - TRIPLL's monthly newsletter.
  - Information about upcoming Work-in-Progress Seminars, webinar and funding announcements, and conference opportunities.
  - Networking opportunities.

Visit <http://tripll.org> for more information.



# **Oral health and healthcare for older adults: why it matters**

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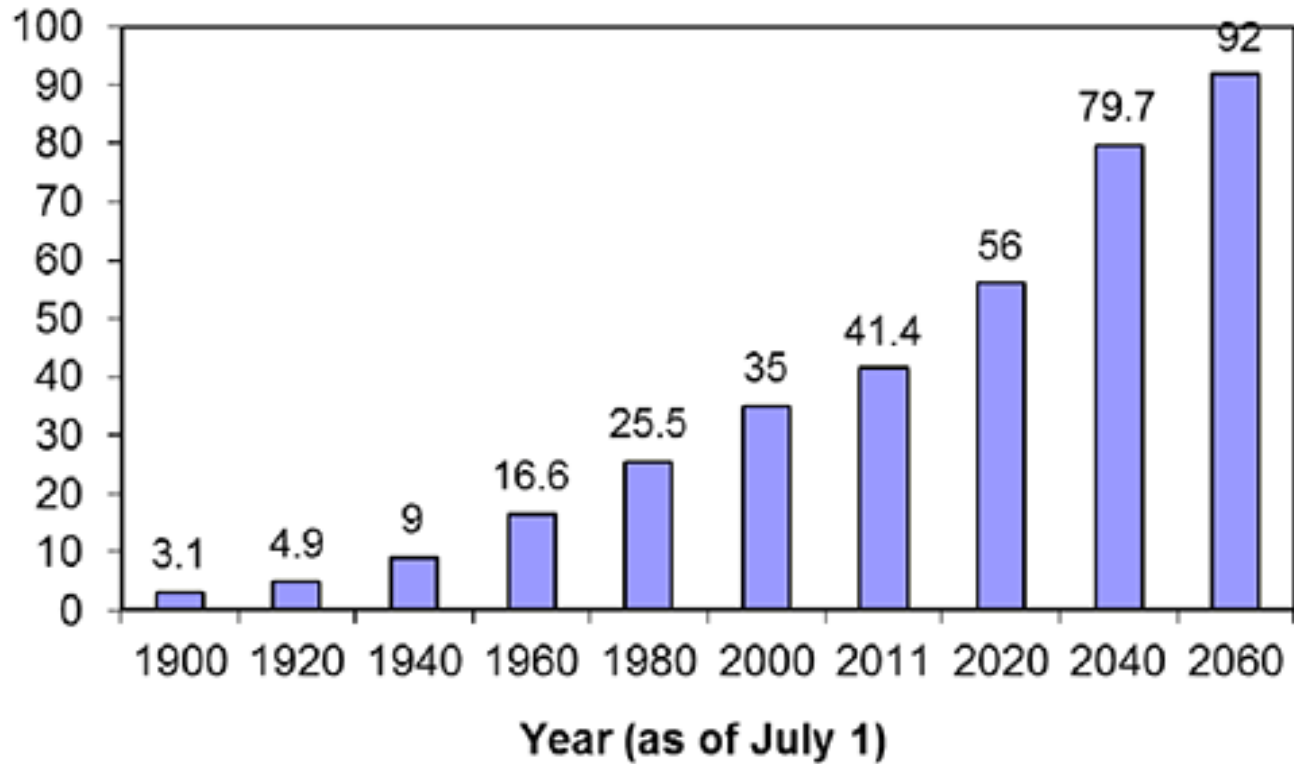
Ira B. Lamster, DDS, MMSc

# The graying of the nation

According to the US Census Bureau,

- The US population will grow 18% between 2010 and 2030, but the population of adults 65 and older will grow by 78%
- By 2050, there will be an estimated 86.7 million older adults in the United States, about 20% of the US population
- The "oldest old" account for 1.5% of the total US population. In 2050, they will comprise 5% of all Americans.
- Source: US Census Bureau: <http://www.census.gov/prod/2006pubs/p23-209.pdf>

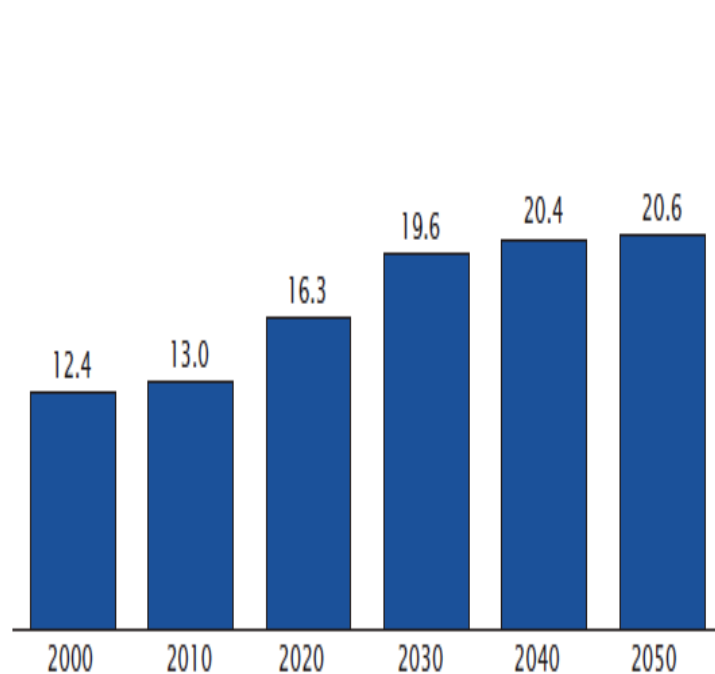
**Figure 1: Number of Persons 65+,  
1900 - 2060 (numbers in millions)**



Administration on Aging: [http://www.aoa.gov/AoARoot/Aging\\_Statistics/Profile/2012/4.aspx](http://www.aoa.gov/AoARoot/Aging_Statistics/Profile/2012/4.aspx)

Figure 2-6.

**Percent Aged 65 and Over of the Total Population:  
2000 to 2050**

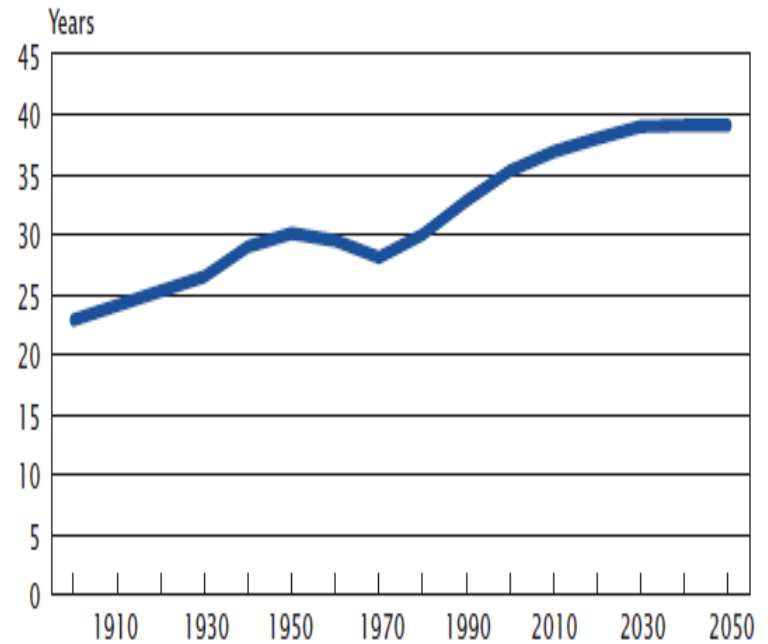


Note: The reference population for these data is the resident population.

Sources: 2000, U.S. Census Bureau, 2001, Table PCT12; 2010 to 2050, U.S. Census Bureau, 2004. For full citations, see references at end of chapter.

Figure 2-7.

**Median Age: 1900 to 2050**



Note: The reference population for these data is the resident population.

Sources: 1900 to 1980, U.S. Bureau of the Census, 1983, Table 42; 1990, U.S. Census Bureau, 2003, Table 12; 2000, U.S. Census Bureau, 2001, Table P13; 2010 to 2050, U.S. Census Bureau, 2004. For full citations, see references at end of chapter.

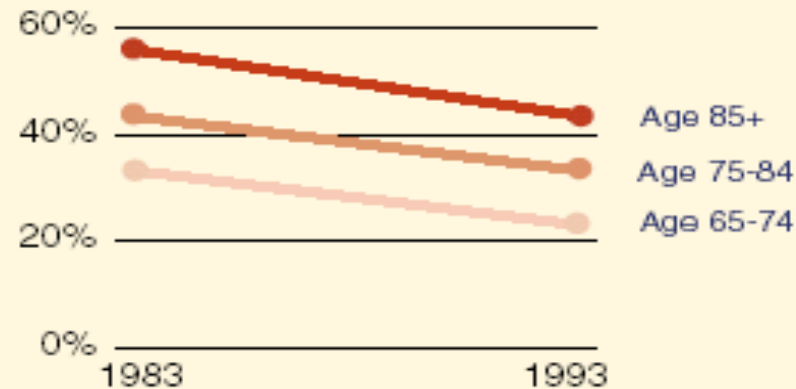
# Health of older adults, 2012

- In the US, people who are 65 years old have an average life expectancy of an additional 19.2 years
- 44% of older adults rated their health as excellent or very good, but there are disparities by race
- Chronic conditions: arthritis (51%), heart disease (31%), cancer (24%), diabetes (20%), hypertension (72%)

# Prevention and tooth retention

## Prevalence of edentulism (total tooth loss) among persons 65 years of age and older by age

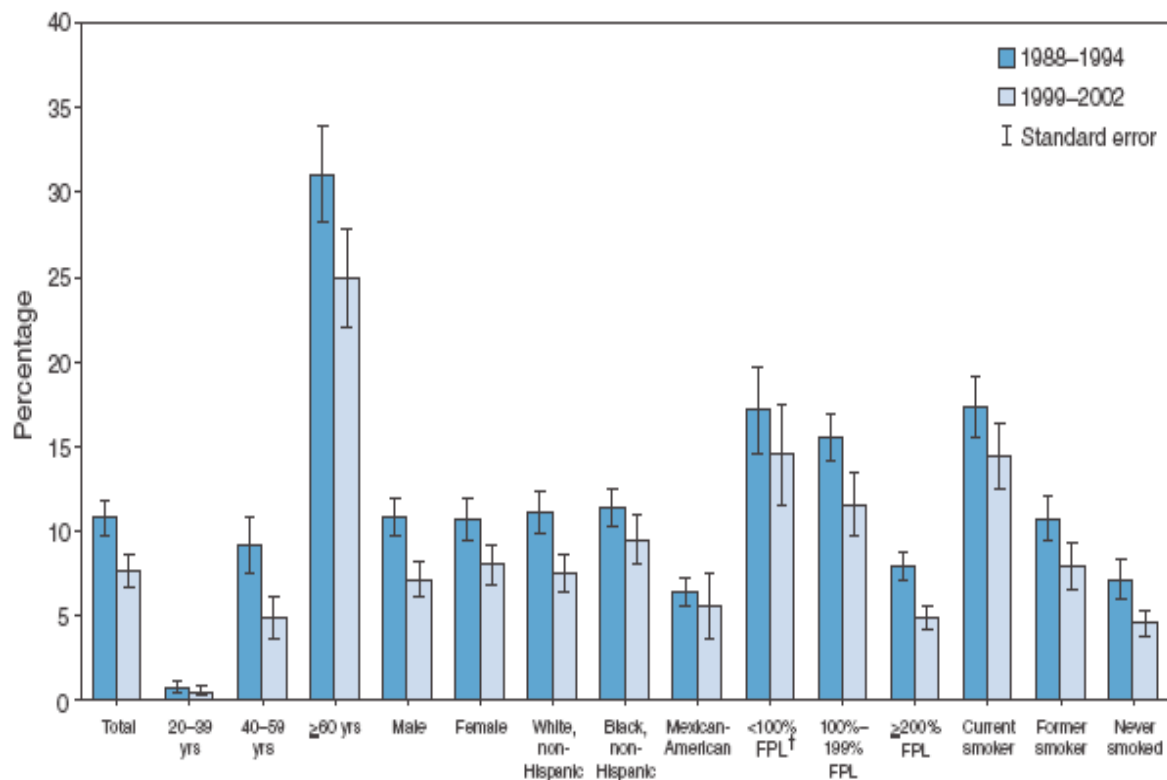
Percent of persons



Source: National Health Interview Survey, 1983, 1993.



**FIGURE 17. Prevalence of edentulism\* among adults aged  $\geq 20$  years, by selected characteristics — United States, National Health and Nutrition Examination Survey, 1988–1994 and 1999–2002**



\* Defined as having lost all permanent teeth, excluding third molars. All estimates are adjusted by age (10-year groups) and sex to the U.S. 2000 standard population, except sex, which is adjusted only by age.

† Percentage of the Federal Poverty Level (FPL), which varies by income and number of persons living in the household.

# Increasing tooth retention, increasing prevalence of dental diseases

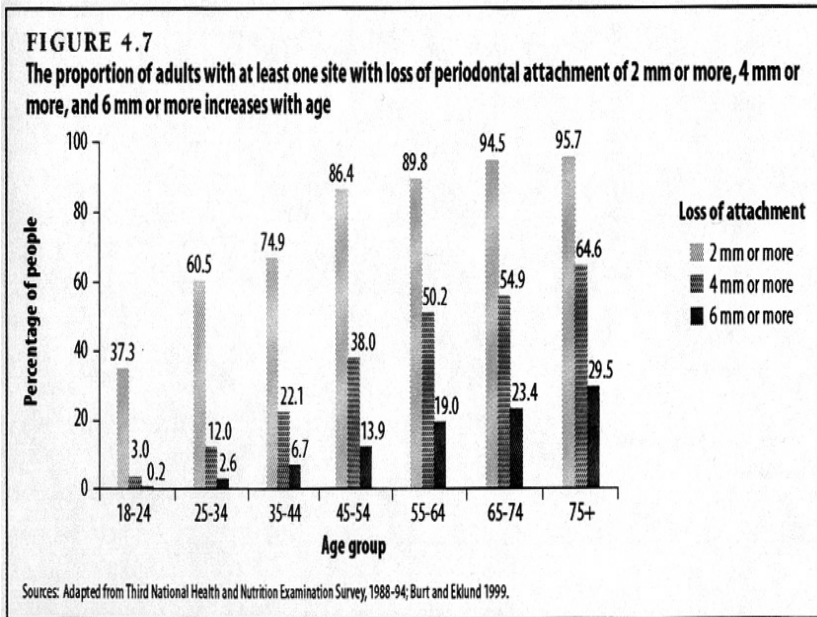
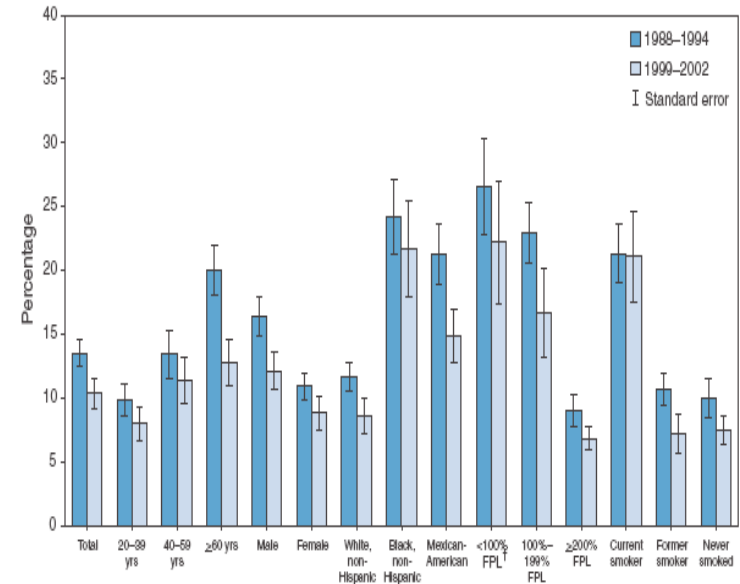


FIGURE 15. Prevalence of untreated root caries\* in dentate adults aged  $\geq 20$  years — United States, National Health and Nutrition Examination Survey, 1988-1994 and 1999-2002



\* Defined as having one or more untreated decayed surfaces in the tooth roots of adults with at least one permanent tooth (dentate). All estimates are adjusted by age (10-year groups) and sex to the U.S. 2000 standard population, except sex, which is adjusted only by age.

† Percentage of the Federal Poverty Level (FPL), which varies by income and number of persons living in the household.

# Dental diseases

Patterns of oral disease differ across the life course

Differentiating normal aging from changes associated with disease; not always obvious.

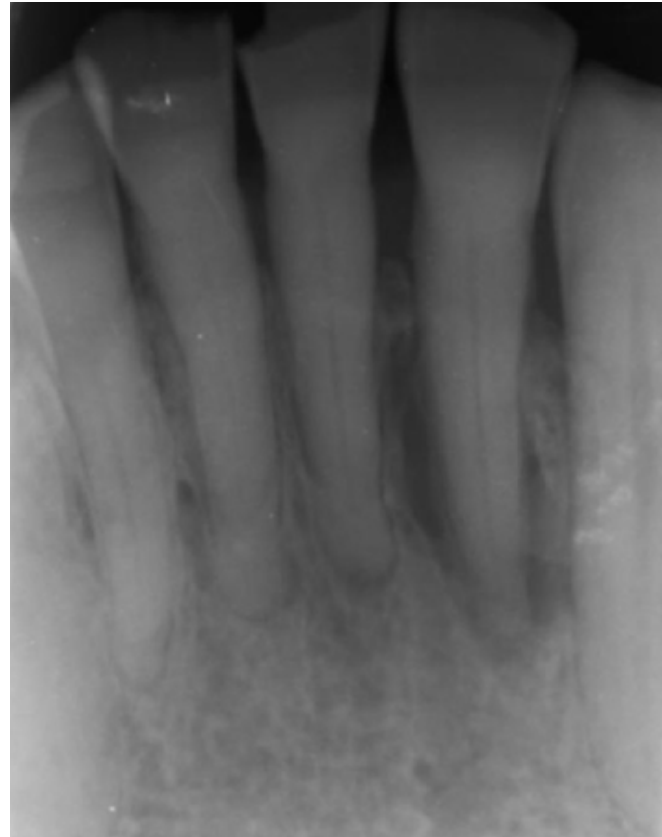
Normal use: the cumulative effect of mastication, oral/dental disease and trauma, over 50 years or more.

# Normal aging

## Teeth

- Occlusal/incisal attrition
- Cusp tips are worn
- Dentin can be exposed due to wear
- Teeth stain, chip and develop fissures
- Teeth become more brittle
- Pulp chambers become smaller as the pulp recedes and secondary dentin is deposited





# Normal aging

## Oral mucosa

- Oral mucosa thins, reduced elastic and collagen fibers

## Salivary gland function

- Normal function expected if the person is not taking medications or is not affected by specific disorders (diabetes, Sjogren's Syndrome)
- More than 400 medications are reported to have xerostomia as a side effect

# Normal aging

## Masticatory function

- Reduced, even if the dentition is intact (related to muscles)
- Reduced preparation of the food bolus for swallowing
- Taste is reduced, and enjoyment of food is reduced



# Oral diseases

## Dental Caries

Compared to younger adults, there is a higher prevalence of root caries and recurrent caries in older adults

### **Risk factors:**

- Sugar (fermentable CHO) intake
- Presence of a removable partial denture and heavy plaque deposits
- Susceptible tooth surfaces
- Reduced frequency and effectiveness of oral self-care
- Dry mouth/reduced salivary flow



# Oral Diseases

## Periodontal Diseases

- Common in older adults
- When monitored longitudinally, older adults demonstrate continued loss of attachment
- New attachment loss occurs at previously unaffected sites
- Key risk factors -
  - cigarette smoking
  - diabetes mellitus
  - specific periodontal pathogens
  - age (reflective of time of exposure)

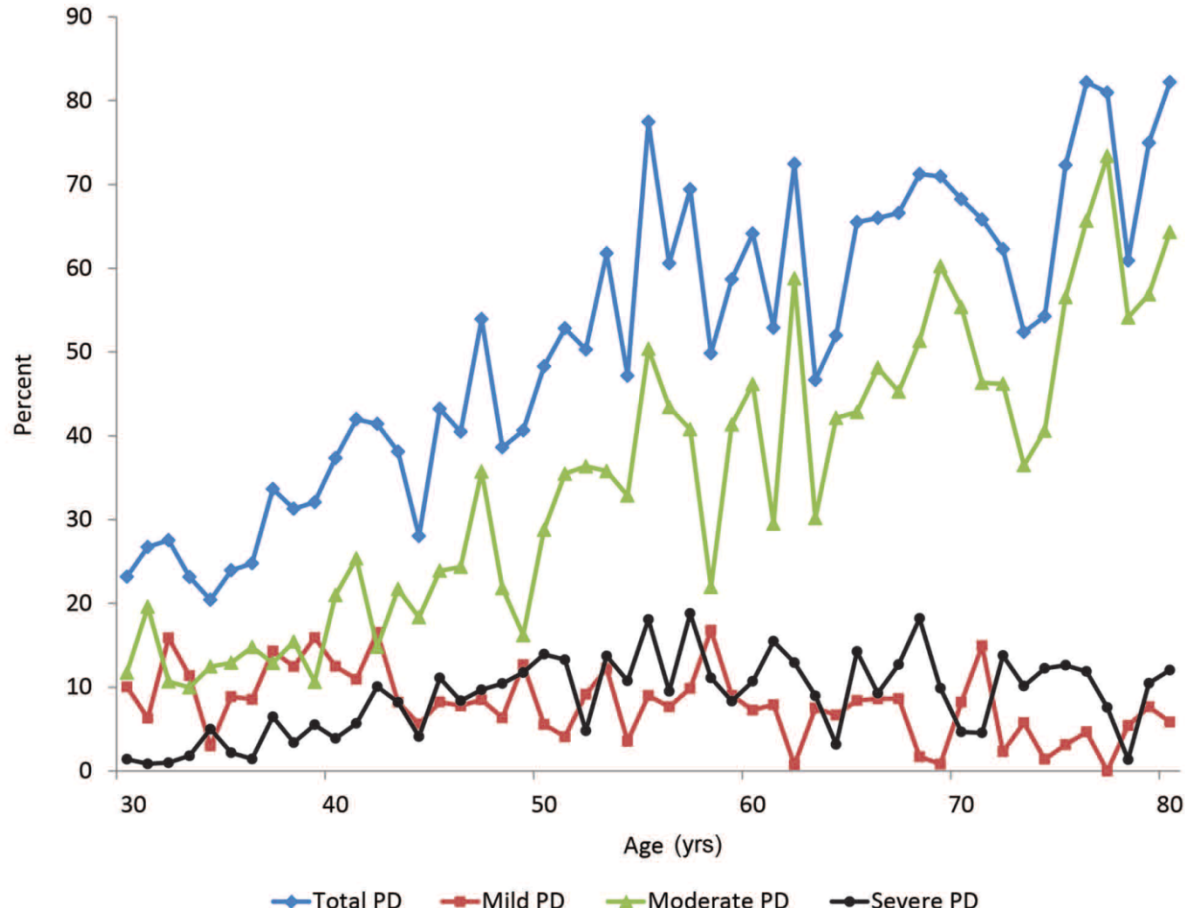


Prevalence of Periodontitis by Selected Characteristics for Persons Aged 30 yrs and Older, United States, 2009-2010

	<b>N</b>	<b>Weighted N in Millions</b>	<b>% Total PD</b>	<b>% Severe PD</b>	<b>% Moderate PD</b>	<b>% Mild PD</b>
<b>Age groups (yrs)</b>						
<b>30-34</b>	435	16.7	24.4	1.9	13.0	9.4
<b>35-49</b>	1,352	54.0	36.6	6.7	19.4	10.4
<b>50-64</b>	1,128	43.4	57.2	11.7	37.7	7.9
<b>65+</b>	828	22.9	70.1	11.2	53.0	5.9

Source: Eke PI, et al. Prevalence of periodontitis in adults in the United States: 2009 and 2010. J Dent Res, 2012

# The percentage of total periodontitis, severe periodontitis, moderate periodontitis, and mild periodontitis by age.



Source: Eke PI, et al. Prevalence of periodontitis in adults in the United States: 2009 and 2010. J Dent Res, 2012

# Oral diseases

## Oral cancer (oral squamous cell carcinoma; OSSC)

- Traditional risk factors
  - cigarette smoking
  - alcohol consumption

(more recently, OSCC occurring in younger individuals has been linked to HPV 16 and HPV 18)

- Stage at diagnosis and survival, are worse in African-Americans vs. whites.

# Oral Cancer

In 2012, estimated that 40,250 individuals (28,540 men and 11,710 women) were diagnosed with oral cancer and 7,850 individuals die of this disease.

From 2005-2009, median age of diagnosis was 62 years, and median age of death was 67 years.

Survival is strongly linked to the stage at diagnosis

Stage at Diagnosis	Distribution (%)	5-year Survival (%)
Localized (primary site)	32	82.4
Regional (spread to regional lymph nodes)	47	57.3
Distant (metastasized)	16	34.9
Unknown (unstaged)	6	50.5



# Epithelial dysplasia



# Carcinoma-in-situ



# Squamous cell carcinoma



# Other oral lesions

Included here are

- Candidiasis: occurs with perturbation of the patients, including diabetes mellitus, and long-term use of corticosteroids and antibiotics.
- Autoimmune disorders affecting the mucosa, i.e. pemphigus (vulgaris) and pemphigoid

# Chronic atrophic candidiasis



# Pemphigus vulgaris



# Oral Diseases

## Xerostomia

- Defined as dry mouth
- Symptom, not a disease. Associated with different conditions:
  - Diabetes mellitus
  - Sjogren's Syndrome
  - Side effect of medications and mouth breathing
- Sequelae include difficulty with mastication, poor enjoyment of food, difficulty speaking, halitosis and increased dental caries rate

# Classes of Drugs with Xerostomia as a Side Effect

- Analgesics (centrally acting)
- Angiotensin – converting enzyme inhibitors
- Anorexiant
- Antacids
- Antiacne agents
- Antiallergy agents
- Antianxiety agents
- Anticholinergic/antispasmodic agents
- Anticonvulsants
- Antidepressants
- Antidiarrheal agents
- Antidysrhythmics
- Antihistamines
- Antihypertensives
- Antinausea agents
- Antiparkinsonism agents
- Antipsychotics
- Bronchodilators
- Calcium channel blockers
- Decongestants
- Diuretics
- Muscle relaxants
- Narcotic analgesics
- Nonsteroidal anti-inflammatory drugs
- Sedatives
- Smoking-cessation agents

Source: Ciancio, JADA, 10/2004



# Why does oral health and function matter?

- Quality of life
- Feeding and nutrition
- Pain
- Systemic-Oral Disease Axis

# Oral health related quality of life

Oral disease and dysfunction may result in:

- Difficulty talking/smiling/kissing/chewing/eating
- Poor facial esthetics
- Halitosis

May impact

- Nutrition and digestion
- Socialization

# Feeding and nutrition

- Fruit and vegetable intake negatively associated with loss of teeth (Joshi-pura et al, 1996; Sheiham et al, 1999)
- Totally edentulous individuals are likely to consume fewer important nutrients (Sheiham et al, 2001; Nowjack-Raymer and Sheiham, 2003)
- Individuals who have lost a substantial number of teeth are more likely to be obese (Sheiham et al, 2002)

# NYC home delivered meal recipients

- 22% edentulous
  - 37% missing all upper teeth
  - 25% missing all lower teeth
- Of those with missing teeth, 49% have replacement dentures

38% report difficulty chewing foods, 37.5% avoid eating some foods, and 34% are uncomfortable eating some foods

# Orofacial pain

“What in the minds of the laity is the outstanding thing in connection with the practice of dentistry? Nothing more or less than pain”

--Best ES, Journal of the American Dental Association, 1939

# Orofacial pain

- 37.2% of people over age 50 complained of oral or facial pain in the past 4 weeks (Locker, 1992)
- 22% of those over the age of 60 reported oral pain in the past week (Lester et al., 1998)
- Toothaches were most frequent oral symptom in older adults (Riley et al., 1998)
- Associated with depression and difficulty chewing. Increased aggression in people living with dementia may also be seen.

# NYC home delivered meal recipients

Pain symptoms (past 12 months)	Frequency (%)
Painful aching in mouth	14.1
Toothache	11.4
Sore spots in mouth	15.0
Sensitive teeth	29.0

# Systemic-Oral Disease Axis

- Oral diseases are associated with a number of chronic conditions
  - Diabetes Mellitus
  - Cardiovascular diseases
  - Respiratory diseases
  - Dementia



# Oral infection and chronic diseases

## Diabetes Mellitus

- Diabetes mellitus is the most important systemic risk factor for periodontal disease (smoking is an environmental risk factor).
- Evidence also indicates that the presence of periodontitis can adversely affect metabolic control in patients with diabetes mellitus.
- Bidirectional relationship

Diabetes Mellitus  Periodontal Disease



# Oral infection /inflammation and chronic diseases

## Cardiovascular Diseases

A recent review by Belstrøm et al (2012) concluded that:

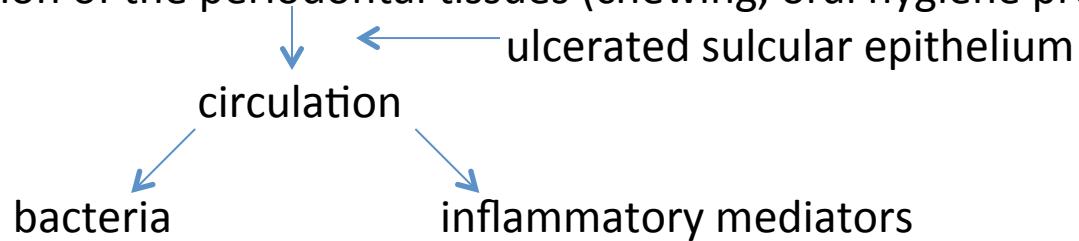
1. There is a relationship between periodontitis and CVD disease.
2. Not due solely to confounders (i.e., smoking and socioeconomic status).

# Oral infection /inflammation and chronic diseases

## Cardiovascular Diseases

### 3. Biologically plausible:

Manipulation of the periodontal tissues (chewing, oral hygiene procedures)



Changes to the vascular endothelium

- a. DNA from periodontal bacteria present in atheromas
- b. periodontitis can increase circulating levels of inflammatory markers
- c. periodontal treatment results in reduction of serum markers of risk for CVD

# Oral Infection /inflammation and chronic diseases

## Respiratory Diseases

Possible biological mechanisms:

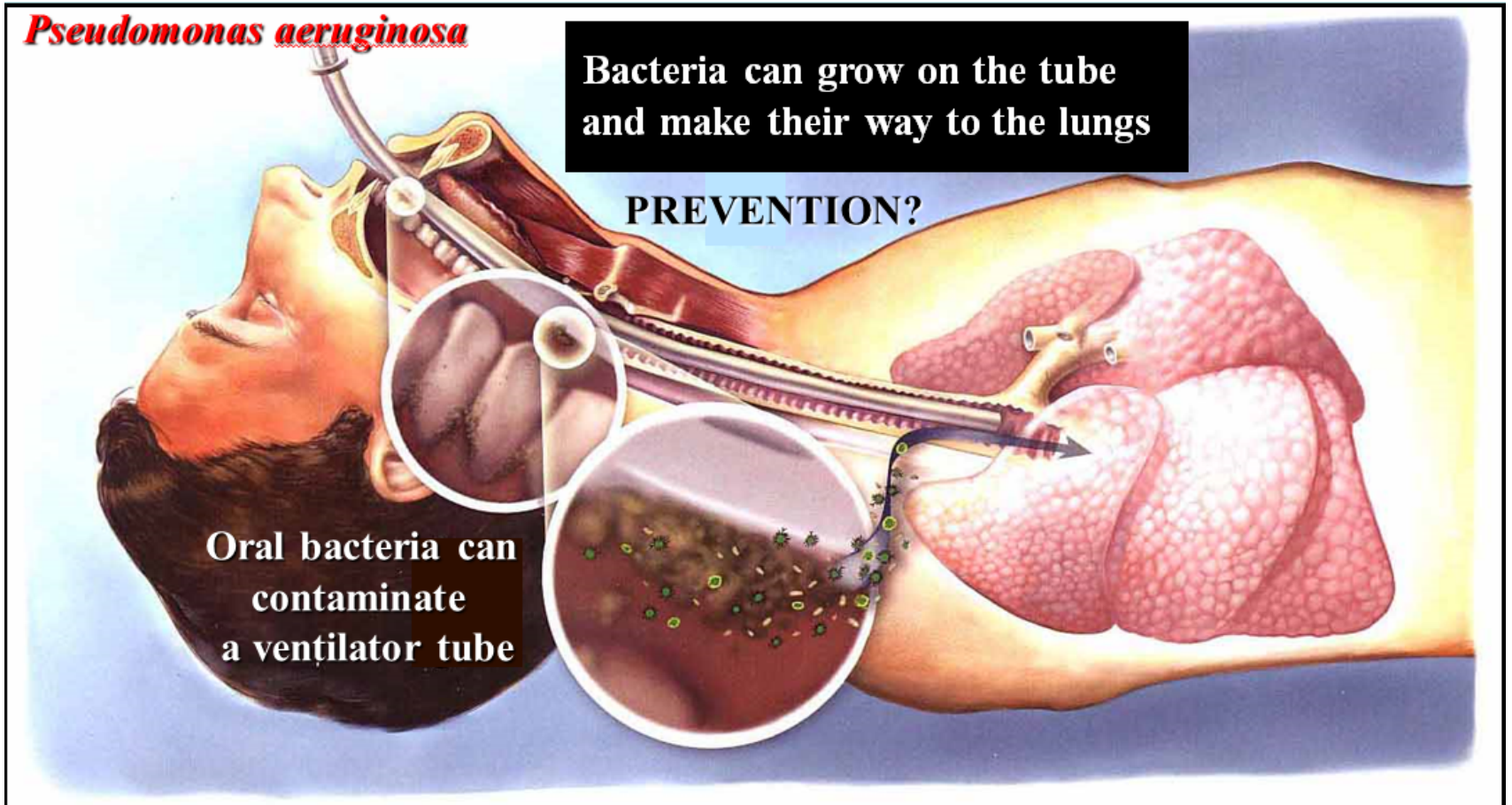
- Direct aspiration of oral organisms into the bronchial tree and lungs. This would be direct infection.
- Enzymes in saliva of patients with periodontitis can modify the mucosal surfaces of the respiratory tract, allowing greater colonization by respiratory pathogens.
- These infections occur more often in patients who are hospitalized, and/or in intensive care units. These individuals tend to be older and incapacitated. In these situations, appropriate oral hygiene practices are often neglected.

***Pseudomonas aeruginosa***

Bacteria can grow on the tube  
and make their way to the lungs

PREVENTION?

Oral bacteria can  
contaminate  
a ventilator tube



# Oral infection /inflammation and chronic diseases

## Other Associations

A number of other associations between periodontitis and chronic disease have been proposed: certain cancers, rheumatoid arthritis, and dementia

The association of oral infection/inflammation with dementia is particularly important in the context of oral health care for older adults

# Oral infection / inflammation and Chronic Diseases

## Dementia /Alzheimer Disease

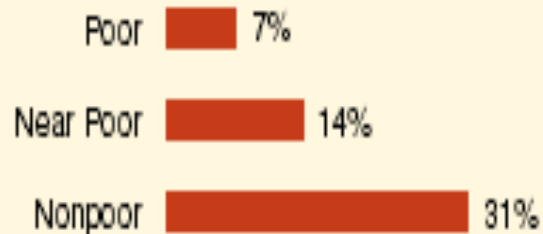
### Biological Plausibility

1. Inflammatory mechanisms: mediators (IL-1, IL-6) from the periodontal tissues enter the bloodstream or, are induced by periodontal pathogens that enter the circulation
2. Oral disease and tooth loss early in life may be a particularly important risk factor.
3. This association may be related to some unknown confounder, i.e., tooth loss may serve as a marker of social and economic stress, including nutritional deficiency.



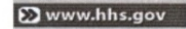
# Access to care

Percent of persons 65 years of age and older with private dental insurance by poverty status, 1995



Source: National Health Interview Survey.

- Medicaid includes dental benefits for adults in a small number of states, including NY
- Medicaid dollars provide oral care for institutionalized elderly



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## Your Medicare Coverage

Information provided is for the state of **New York**

**The Medicare coverage information matching your selection criteria is shown below.**

<b>Dental Service</b>	
<b>Coverage under Medicare</b>	<p>Medicare does not cover routine dental care or most dental procedures such as cleanings, fillings, tooth extractions or dentures. Medicare does not pay for dental plates or other dental devices. Medicare Part A will pay for certain dental services that you get when you are in the hospital.</p> <p>Medicare Part A can pay for hospital stays if you need to have emergency or complicated dental procedures, even when the dental care itself is not covered. In these cases you should call your Fiscal Intermediary for more information.</p>
<b>The amount you need to pay</b>	In general, you pay 100% for dental services.
<b>The part of Medicare that pays for this service or supply</b>	Not Currently a Medicare Benefit
<b>Medicare Contact for additional information</b>	State of New York Fiscal Intermediary: 1-800-633-4227 1-800-MEDICARE
<b>Important notes</b>	No Important Notes to Display

# Percent distributions of length of time since last contact with dentist or other dental health professional

<b>Selected Characteristic</b>	<b>Less than 1 year</b>	<b>5 years, and never</b>
<b>Age</b>		
18-44 years	58.5	12.2
45-64 years	64.8	12.3
65-74 years	60.0	19.3
75 years and over	54.9	25.5

# Addressing oral health

- We need a multidisciplinary comprehensive approach that involves community, dental and non-dental providers and policy makers
- Challenges
  - Policy and financing
  - Workforce

# Daily oral care

Daily oral care is key to prevention of oral diseases and improving quality of life

- Reduction of morbidity
- Arrest disease processes
- **Simple, non-invasive and inexpensive**

# The role of the non-dental provider Physicians

- Assess risk
  - Behaviors
    - Diet, tobacco, self care
  - Chronic disease
    - Diabetes, CVD, medications
  - Function
  - Access to and utilization of professional dental services
- Signs and symptoms
  - Pain, swelling, difficulty eating, difficulty talking
  - Non-verbal cues in dementia patients
- Consider assessment of the oral cavity on an annual basis
- Pain management, referrals, reinforce daily oral care

# The role of the non-dental provider Nurses

- Monitor risk and signs and symptoms in both the community and LTC settings
- Report deviations from the norm to physician or dentist
- Referrals to dentist or physician
- Reinforce daily oral care
- Consider oral assessment once a year

# The role of the non-dental provider HHA/HA/CNA

- Monitor changes in signs and symptoms
  - Report all changes
- Assist with/facilitate daily oral care (HA: provide reminder)



# **The role of the non-dental provider**

## **Social workers/case managers**

- Risk and risky behaviors
- Signs and Symptoms
- Linkages and referrals
- Consider outreach

# Daily oral care Supplies

## **Use:**

- Soft/ultra soft toothbrushes
- Fluoridated toothpaste
- Alcohol-free rinses
- Denture brushes should be used to clean dentures

## **Do not use:**

- Glycerin Swabs
- Hard toothbrushes

**Note:** Rotary/electric toothbrushes may increase agitation

# Daily oral care

## Specialty products

- Prescription strength fluoride gel
- Chlorhexidienne (prescription)
  - Helpful for people who cannot spit
- Toothbrushes
  - Dr. Barmans
  - DexTBrush

# Low foaming toothpastes/gels



# Dr. Barmans



# DexTBrush



# Addressing oral health

## Policy considerations

- Financing for access to and utilization of professional dental services
  - Coverage for dental services under Medicare
  - Coverage for daily oral care aides (toothbrush, toothpaste, denture care)
  - Improved oversight of dental services provision in LTC
- Integrate oral health services among existing service delivery systems that target older adults
  - Home care, LTC, MOW/Home Delivered Meals, Senior Centers, NORCs, Congregate meals etc
    - Daily oral care, linkages to dental services, QA
- Improve training of dental and non-dental providers to address oral health in older adults