Screening for medical conditions in a dental setting

Barbara Greenberg, MSc, PhD
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What and why
The integration of oral health care providers into strategies to enhance early identification of individuals at risk of developing disease yet unaware of their increased risk, who could benefit from early medical intervention.

Asymptomatic, at risk individuals, identified and referred for medical follow up to prevent/delay disease onset or control disease severity.

(Glick, Greenberg JADA 2005; Greenberg & Glick Dent Clin North Am 2012)

The Dental Office as a “Lab”
- This presentation is limited to screenings provided within dental facilities and does not apply to tests sent to outside labs.
- Focus is chairside screenings with immediate results for increased risk of CHD, diabetes and for HIV and HCV.
- Will provide: disease trends, support for screening, screening strategies & the how to.

Why screen in a dental setting
- An under utilized resource for disease control and prevention.
- 60-70% of adults visit the dentist in a given year.
- 10-24% of those have not see a physician in the same time period.*
- Point of care testing tools exist.

Tenets of effective screening
- Purpose is to delay onset, control severity or monitor.
- Most effective for diseases with recognized modifiable risk factors.
- Success also requires simple, cheap, effective screening tools.
- Most useful for prevalent diseases with high morbidity and or mortality.

Heart Disease
- Incidence and prevalence remains high, and expected to increase, while deaths attributed to heart disease are falling.
- Risk is associated with a variety of well recognized, modifiable risk factors (smoking, blood pressure, total cholesterol, HD) and age.
- 1/3 to >2/3 of people are unaware of their risk factor/s.

Heart disease and oral health
- Observational studies suggest an association of heart disease and periodontal disease (mechanism uncertain).
- Periodontal interventions decreasing local periodontal inflammation, and short term reduction in systemic inflammation & endothelial dysfunction.
- NO evidence that perio. interventions prevent heart disease or modifies heart disease outcomes.
- NO evidence for causal relationship.

DM and oral health
- Diabetes Mellitus Perio. Disease

Heart disease and diabetes: prevalence, mortality, morbidity in U.S.

Heart disease and diabetes: economic cost, primary prevention, screening
Heart disease and diabetes public health goals

Heart disease public health goals
- Healthy people 2020
  - Improve cardiovascular health through risk factor prevention, detection, and treatment; early identification and treatment.
- American heart assoc. strategic impact goals
  - Improving cardiovascular health by 20%; decrease CVD deaths by 20% by 2020.
- FDI: 2012 policy statement on NCDs
  - Shift to horizontal approach and more integration with other disciplines tackling NCDs

Diabetes public health goals
- Healthy people 2020:
  - Reduce disease and economic burden of DM
    - Obj D1: “to reduce the number of new case of diagnosed diabetes in the population;”
  - Under oral health: increase the proportion of adults who are tested or referred for glycemic control from dentist or dental hygienist in the past year
- American Diabetes Goals 2012:
  - Double % Americans aware of their pre-diabetes; 10% increase in people who engage in preventive behaviors.

Importance of screening for CHD & DM

Undiagnosed prevalence: 29-71%
- CHD: 29-71%  DM: 30%
Primary prevention:
- CHD: 21-37% incidence and up to 71% reduction in risk prevalence
- DM: 51% incidence & 43% reduction in relative risk

Chairside screening strategy for the dental setting

Chairside screening technique
- CHD: Calculation of Framingham Risk Score
  - Computer program to calculate score using:
    - Age, smoker (yes, no), gender: medical history
    - Blood pressure measurement
    - Total cholesterol and HDL: finger stick blood

- DM: Determination of Hemoglobin A1c
  - Finger stick blood
  - Glick & Greenberg JADA 2005; Greenberg et al. JADA 2009

CHD: Framingham Risk Score

DM: A1c test
- A1c well-standardized measure of average glucose over 3 months
- 2010 endorsed for screening & diagnosis of DM
  - A1c ≥5.7% -6.4% screen positive
  - A1c ≥6.5% diagnosis positive
Will this work? What do we know?

- Efficacy/yield studies
  - Efficacy studies of screening
  - Effectiveness/yield studies

- Surveys
  - Dentists attitudes surveys
  - Patient attitudes surveys
  - Physicians attitudes surveys

Efficacy studies

- Theoretical calculations: NHANES data 1999-2002:
  - Men 40+ yrs of age, no reported history of disease /factors, phys -/ dentists + in last 12 mths.
  - 18% had Framingham Risk Score > 10% (N=350)
  - 2000 US Census Data for men 40-85 years old:
    - 259,636 with a >10 to <20 percent risk of CHD
    - 72,625 with a ≥ 20 percent risk of CHD

  Glick & Greenberg JADA 2005

Efficacy studies

- Clinic-based studies:
  - Newark, NJ, USA : risk screening (Greenberg et al JADA 2007)
    - 17% had FRS >10%
    - 23% abnormal A1c (cutpoint 5.7%) (Greenberg, unpublished)

  - New York (Harlem), NY : disease screening ((Lalla et al. JDR 2011)
    - A1c Sensitivity alone = 75%
    - A1c + 2 dental parameters (at least 4 missing teeth and at least 26% of teeth with deep periodontal pockets) sensitivity= 92%

- Yield studies: Sweden with European Heart Score
  - 50% given medical intervention (Glick, Jontell JADA 2009)

Attitude Studies

Dentist and patient attitudes

- Majority felt important for a dentist to conduct chairside medical screening and willing to participate.
- Most important considerations among dentists: patient willingness; insurance coverage least impt.
- Most important considerations among patients: OHP training and confidentiality
- Majority of patients willing to pay $20 for tests

Physicians’ Attitude Survey:

- Majority willing to discuss results w/ dentist
- Majority willing to see patients referred from dental setting.
Majority felt unimportant referral came from dentist.
Professional opinion of dentist improved or remained the same if dentist screened for medical conditions in the dental office.
Most important consideration: OHP level of training

Criteria for screening
- ≥40 years of age
- No prior diagnosis of heart disease or diabetes
- No reported medication use for high blood pressure, high cholesterol, impaired glucose metabolism
- Have not seen a physician in the prior year

CardioCheck Components

Running the Test
Insert MEMo Chip®.
Insert the MEMo Chip that matches the lot number on the test strip vial. Press either button ( or ) to turn the CardioChek PA instrument ON

Inserting test strip

Insert test strip. Push the test strip in as far as it will go.
The analyzer will then display APPLY SAMPLE (apply finger stick blood sample)

Applying Sample to Test Strip
- Once sample is applied, results will appear on the display within about two minutes.
- If running a multi test strip, strike the NEXT button to see subsequent results.

A1c NOW: how to overview

Conducting the Screening
A1CNow
Glycosylated Hemoglobin

AC1 Components

Procedure – Before You Begin
- Ensure that the lot number on following components match:
  - back of the monitor
  - pouch test cartridge #2
  - sample dilution kit # 1

Insert Blood Collector

Results
- 5 min to results
  - If “QCOK” is not displayed please see list of error codes.
  - >5.7%-6.5% positive screen
  - >6.5% positive DM diagnosis

HIV and HCV screening

Why screen in a dental setting?
- 65-70% adults see their dentist in a given year. (ADA)
10-24% of those have NOT seen a physician in that same time frame. (Glick and Greenberg 2005; Pollack et al. 2010; Strauss AJPH 2012)

70% of people with self reported HIV risk see the dentist in a 2 year period; 60% of those have never been tested and received no preventive medical care. (Pollack et al 2010)

HIV/AIDS epidemiology

HIV / AIDS Epi of first diagnosis

41% receiving first HIV diagnosis between 2006-2009 had no history of HIV testing

- Highest rate in ≥50 yrs age then 40-49 yrs. age

- Among these, 37% received a diagnosis of AIDS within 6 months after HIV testing*

*Note: This is not because of super infection but represents late to testing

Oral manifestations

- 1990s: Oral lesions estimated to occur in 50% of patients living with HIV/AIDS.
- Dramatic decrease with combination antiretroviral therapy.
- Oral manifestations such as pseudo-membranous candidiasis may suggest HIV, but are not diagnostic.


Public health goals for HIV

Healthy People 2020 HIV testing goals

- HIV-13: “Increase the proportion of persons living with HIV who know their status”
  - Baseline: 80.6%
  - Goal: 90.0%

- HIV-14: “Increase the proportion of adolescents and adults who have been tested for HIV in the last 12 months”
  - Baseline: 15.4% (15-44yr olds)
  - Goal: 16. 9%

CDC & USPSTF screening recommendations

- 2006: CDC recommends routine HIV testing among all adolescents and adults and use of alternative settings for testing.

- 2013: USPSTF poised to release a recommendation endorsing routine testing on all adolescents and adults

  - Significance: Affordable Care Act mandates all public/private insurers cover USPSTF-recommended preventive services with no copay.

Timeline for HIV screening in a dental setting

- 2004 Oraquik rapid HIV-antibody point of care test (OraSure Technologies Inc, PA, USA):
  - FDA approved for use with oral mucosa transudate
  - Allows for increased turn around time and acceptability

- 2006: CDC revised recommendations for HIV screening/testing in routine health care settings
  - Shift to routine testing regardless of risk
  - Broadening of health care setting as testing sites
  - Reducing concurrent diagnosis within a year (later to test)

- 2005, 2010: 10-20% of patients who see their dentist in the previous 12 months DO NOT see a physician
  
  ( Glick and Greenberg JADA 2005; Strauss et al. 2008; Pollack et al. AJPH 2010 )

Provider and patient attitudes

- Majority of oral health care providers feel it is important to screen for HIV in a dental setting.
- Majority of patients would be willing to be screened for HIV in a dental setting.
- Majority of physicians support HIV screening in a dental setting.
Expressed concerns: providers

Provider concerns:
- Patient willingness most important
- Need for training
- Referral mechanism
- Outside scope of practice
- Reimbursement

Expressed concerns: patients

Patient concerns:
- Confidentiality: the most important concern
- Logistics related to a positive screening test
- Importance of linkage to care
- Not being done by a physician least important

Importance of early HIV identification

- Knowing HIV status more likely to change high risk behavior. (Marks et al. JAIDS 2005)
- Persons who know their status reduce high risk sexual behavior by 66% (Marks et al. JAIDS 2005; Marks et al. AIDS 2006)
- Early identification can reduce transmission rates by 95% (from HIV prevention Trial Network 052) (Cohen et al. NEJM 2011)

Caveats

2. Due to a decrease in sensitivity in low prevalence (<1%) populations see a decrease in positive predictive value (from 98% to 88%) (Pant Pai et al. The Lancet 2012)


How does rapid HIV test work

- Antibody response to HIV-1 antigens (usually envelope proteins gp41, gp120 or gp160)
- Effective for all known serotypes; takes advantage of high levels of HIV antibodies in crevicular fluid (Lamey et al. J Oral Pathol Med 1996)
- Easy to use and interpret; results in 20 minutes
Lower sensitivity with oral fluid vs blood (Pavie et al PLoS One 2010) but not seen in field trial (Zachery et al. BMC Infect Dis 2012)

No effect on sensitivity after dental cleaning or within 5 minutes of using mouthwash

OraSure has a sensitivity of 98% and specificity of 99%

Viral Hepatitis

Viral hepatitis epidemiology


Public health support for HCV testing

Healthy People 2020

- Reduce new hepatitis C infections from 0.3 to 0.2 per 100,0000 population.
- Among the actions cited are: improving, testing, care and treatment and strengthening surveillance.

CDC HCV testing recommendations

- Expanded: final document issued June 2012
- Testing can save lives and is cost-effective
- Existing recommendations.
  - Test: those with risk factors, known exposure; or signs or symptoms of liver disease,
  - New, expanded recommendations
  - Test all persons born from 1945-1965

Importance of HCV testing

Characteristics of HCV epidemic

- 2 fold increase by 2019. (Rain et al. Dig Liver Dis 2011)
- Baby boomers (born 1945-1965) 6 x more likely to be infected. (Spradling et al. Clin Infect Dis 2013)
- >75% (2.1 mill.) with HCV are baby boomers (Smith et al. The Liver Meeting 2011)
- Chronic infection lasts a lifetime; leads to chronic liver disease, cirrhosis, liver cancer.
  (CDC/ Bednarsh Dim Dent Hyg 2012)

Characteristics of HCV epidemic

- Considered a “silent epidemic”
  - 75% (1.5 mill.) may be unaware of their infection
  - 37% will die without treatment
  - New treatments can provide viral cure for up to 90% of those treated

CDC/ Bednarsh Dim Dent Hyg 2012; Rain et al. Dig Liver Dis 2011; IOM report 2012

Point of care HCV screening tests

- OraQuick rapid sera test using finger stick blood: sensitivity 97.8- 99.3%/ specificity 99.5%
  - Detects antibodies on average 3 days earlier than EIA test
  - At least as sensitive as EIA
- FDA (2011) approved, CLIA waived POC HCV test: finger stick blood & venipuncture specimens
- OraQuick oral swab POC test in community based studies showed comparable results to laboratory based tests
  ï Expect to submit data in support of FDA oral fluid approval in 2013

HIV Oraquik Test: how to

HIV testing kit

Oral Fluid – Specimen Collection

✓ Remove test device from Pouch.
   DO NOT touch the flat pad.

✓ Label device with subject information.
   DO NOT block holes on back of device.

✓ NOTE: Test Device must be inserted into vial within 30 minutes of sample introduction.

✓ Make sure an Absorbent Packet is present. If no Absorbent Packet is present, discard Device; obtain a new Pouch for testing.

Interpreting a Reactive Test

Interpreting a Non-Reactive Test

HCV testing kit

A Simple Test Procedure: for all sample types

Oral Fluid – Specimen Collection

✓ Place the flat pad above the teeth against the outer gum.
   i Gently swab completely around the outer gums, both upper and lower, one time around, using the Flat Pad.
   i DO NOT swab the roof of the mouth, the inside of the cheek or the tongue.
   i NOTE: It is okay to use both sides of the Flat Pad during this procedure.

Prototype OraQuick® HCV Test - Interpretation

Non-reactive: Single line appears at the C (control) triangle
   A negative result indicates the absence of HCV antibodies in the sample

Critical values for physician referral

Safety Precautions For Testing

➢ Review and follow manufacturers directions
➢ Train all staff on testing procedures
➢ Establish standard operating procedures
➢ Calibrate machines/ & use quality controls

➢ Reminder about Standard Precautions

➢ Indicated for use when there is a possibility of exposure to blood or other body fluids, non-intact skin, etc are expected to be used as indicated when performing medical screening.
➢ These precautions are procedurally based and can be anticipated so that you can develop SOPs for each procedure and train staff to follow them.

➢ Standard precautions

✓ Wash hands or use an anti microbial hand rub.
✓ Wear gloves.
✓ Clean patient’s finger with alcohol wipe/wipe excess with gauze pad.
✓ Use new test kit/materials for each patients.
✓ Dispose of lancets, used materials appropriately
✓ Clean any contaminated or potentially contaminated environmental surfaces with
intermediate level hospital disinfectant.

- Appropriately disinfect reusable test machine (CardioChek)

75 [CLIA certification]

- What is CLIA (clinical laboratory improvement act)
  - 1988 act to establish quality standards for lab testing to ensure accuracy, and timeliness of results
  - All facilities (e.g., dental office) examining human specimens must register with federal Centers for Medicare and Medicaid (CMS) and obtain CLIA certification

- All tests discussed are CLIA waived
  - Use unprocessed specimens
  - Easy to use and little risk of incorrect results

- Type of certificate is a Certificate of Waiver
- Applications CMS website or state health department

76 Web-based resources

- Diabetes clinical guidelines: [http://care.diabetesjournals.org/content/34/Supplement 1](http://care.diabetesjournals.org/content/34/Supplement 1)
- American Heart Association website: [http://www.heart.org/HEARTORG/](http://www.heart.org/HEARTORG/)
- Centers for Disease Control. Diseases and conditions website: [http://www.cdc.gov/diseasesconditions/](http://www.cdc.gov/diseasesconditions/)

77 Video how to links

- [http://www.youtube.com/watch?v=1rdTEG7MZRA](http://www.youtube.com/watch?v=1rdTEG7MZRA)
p=professional-instructional-dvd/index.html
- [http://www.oraquick.com/Taking-the-Test/How-To-Video](http://www.oraquick.com/Taking-the-Test/How-To-Video)

78 Other considerations

- State testing and scope of practice laws
- CLIA application/approval
- Receipt of appropriate training on how to perform and interpret screening tests properly
- Decide which personnel in office will be involved in screening (gain by in from all)
- Mechanisms for referral and follow up care
- Availability of appropriate information sheets/pamphlets

Reznik www.cdcworld.com/courses/4410

79 [More to do!]

- Cost effectiveness analysis
- Outcomes assessment
- Practitioner training
- Practitioner reimbursement
- Effective referral mechanism
- Mechanisms to enhance referral completion
- Engage sectors outside health care

80 Thank you