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Regenstrief Institute
Better Care. Better Health.

Integrating health behavior measures into Electronic Health Records: impact on public health and research

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Outline of today's talk

- Major health behavioral factors that impact oral health
- Use case: Implementation of a tobacco cessation counseling intervention
- Lessons learnt
- Future work
- Impact on research

Social and health behaviors that impact oral & general health

- smoking
- alcohol
- obesity
- stress
- human papilloma virus infection
  - linked to certain sexual behaviors

Modifiable risk factors for periodontal disease

Risk factor	Modification
Smoking	Smoking cessation
Poorly controlled diabetes	Improved glycemic control
Obesity	Diet & exercise
Osteoporosis	Bone sparing agents, calcium & vitamin D supplementation
Low dietary calcium & vitamin D	Calcium & vitamin D supplementation
Stress & inadequate coping	Stress-reduction measures

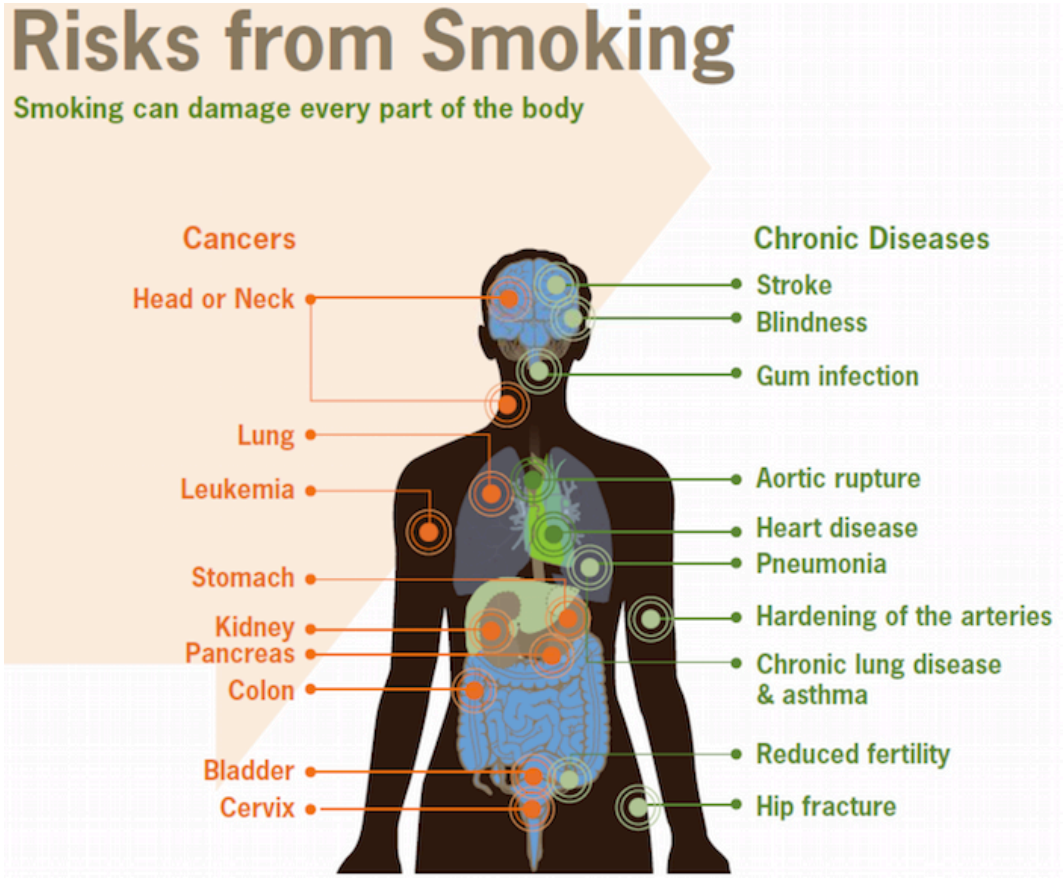
Genco RJ, Borgnakke WS. Risk factors for periodontal disease. Periodontol 2000. 2013 Jun;62(1):59-94.

US prevalence of risk factors for periodontal disease

Risk factor/Indicator	Prevalence in the US
Cigarette smoking	19.3% of adults in 2010
Diabetes mellitus	8.3% all ages (2.37% undiagnosed) 12.8% of adults (25.6 million), including 5% (10 million undiagnosed
Pre-diabetes	35% of adults
Osteoporosis	7.9% of women
Dietary calcium deficiency	1/3 below 50% of the recommended dietary allowance
Stress-work related	30-40%
Obesity	36% (78 million) of US adults 18% of US children http:// www.cdc.giv/obesity/data/adult.html

Genco RJ, Borgnakke WS. Risk factors for periodontal disease. Periodontol 2000. 2013 Jun;62(1):59-94.

Impact of smoking on our health



https://www.cdc.gov/tobacco/infographics/health-effects/index.htm

Obesity

Genco RJ, Borgnakke WS. Risk factors for periodontal disease. Periodontol 2000. 2013 Jun;62(1):59-94.
Hayden C, Bowler JO et al. Obesity and dental caries in children: a systematic review and meta-analysis. Community Dent Oral Epidemiol. 2013 Aug;41(4):289-308.

Documenting health behaviors during patient encounters

- social history: part of history & physical examination during medical and dental patient visits
- smoking, alcohol, diet

How do we use health behavior information during patient care?

- assess risk for oral diseases:
  - dental caries
  - periodontal disease
  - oral cancer
- assess treatment plan outcomes
- educate patients:
  - impact of health behaviors on oral health
  - relation between oral and systemic diseases

But…..

- providers offer inconsistent support to screen and refer patients through health behavior interventions:
  - tobacco cessation counseling
  - healthy diet education
  - weight loss programs

Missed opportunity!

- Change is a process, not an event.
- Medical and dental settings provide an opportunity to offer health behavior change counseling over a period of time.
- Decision support tools that integrate health behavior measures into the EHR are critical.

Impact on public health

- integrating health behavior measures into EHR have the potential to:
  - enable clinicians to shift from disease specific risk assessment to risky health behavior assessment common to almost all diseases
  - generate meaningful information to assess impact of certain health behaviors on oral & systemic health

Mouth-Body connection: Current status

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Mouth-Body connection: Current status

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Computer-assisted tobacco intervention (CATI) tool in dental practice settings

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Health Partners Institute, Minneapolis, MN

Integrating Tobacco Dependence Counseling into Electronic Dental Records: A Multi-Method Approach

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Computer-Assisted Guidance for Dental Office Tobacco Cessation Counseling

D. Brad Rindal, DDS, William A. Rush, PhD, Titus K.L. Schleyer, DMD, PhD, Michael Kirshner, DDS, MPH, Raymond G. Boyle, PhD, MPH, Merry Jo Thoele, RDH, MPH, Stephen E. Asche, MA, Thankam Thyvalikakath, DMD, MDS, PhD, Heiko Spallek, DMD, PhD, MSBA(CIS), Emily C.U. Durand, RDH, Chris J. Enstad, BS, and **Charles L. Huntley, MBA**
HealthPartners Research Foundation (Rindal, Rush, Asche, Durand, Enstad); ClearWay Minnesota (Boyle), HealthPartners Dental Group (Huntley), Minneapolis; Center for Health Promotion (Thoele), St. Paul, Minnesota; School of Dental Medicine (Schleyer, Spallek Thyvalikakath), University of Pittsburgh, Pittsburgh, Pennsylvania; Health Informatics (Kirshner), Oregon Institute of Technology, Portland, Oregon

Dental Hygienists' Usage of Tobacco-Cessation Decision Support Tools in Practice: A Qualitative Study

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HealthPartners Institute

Study objectives

- create a decision support system that guided providers to discuss tobacco use based on:
  - the patient's desire to quit
  - level of nicotine addiction
- evaluate dentists'/hygienists':
  - assessment of patient's interest in quitting
  - delivering brief tobacco interventions
  - refer patients to quit-line
- performed focus groups, workflow observations, system design and randomized control trial

Workflow observations

- hygienists performed clinical documentation
  - recorded whether patient used tobacco in the history section
  - documented tobacco use for risk assessment & treatment plan
- information recorded in one place not automatically updated to other relevant sections
- providers experienced difficulty with determining patients' level of nicotine dependence
- no convenient space to document and recall the notes at the next appointment.

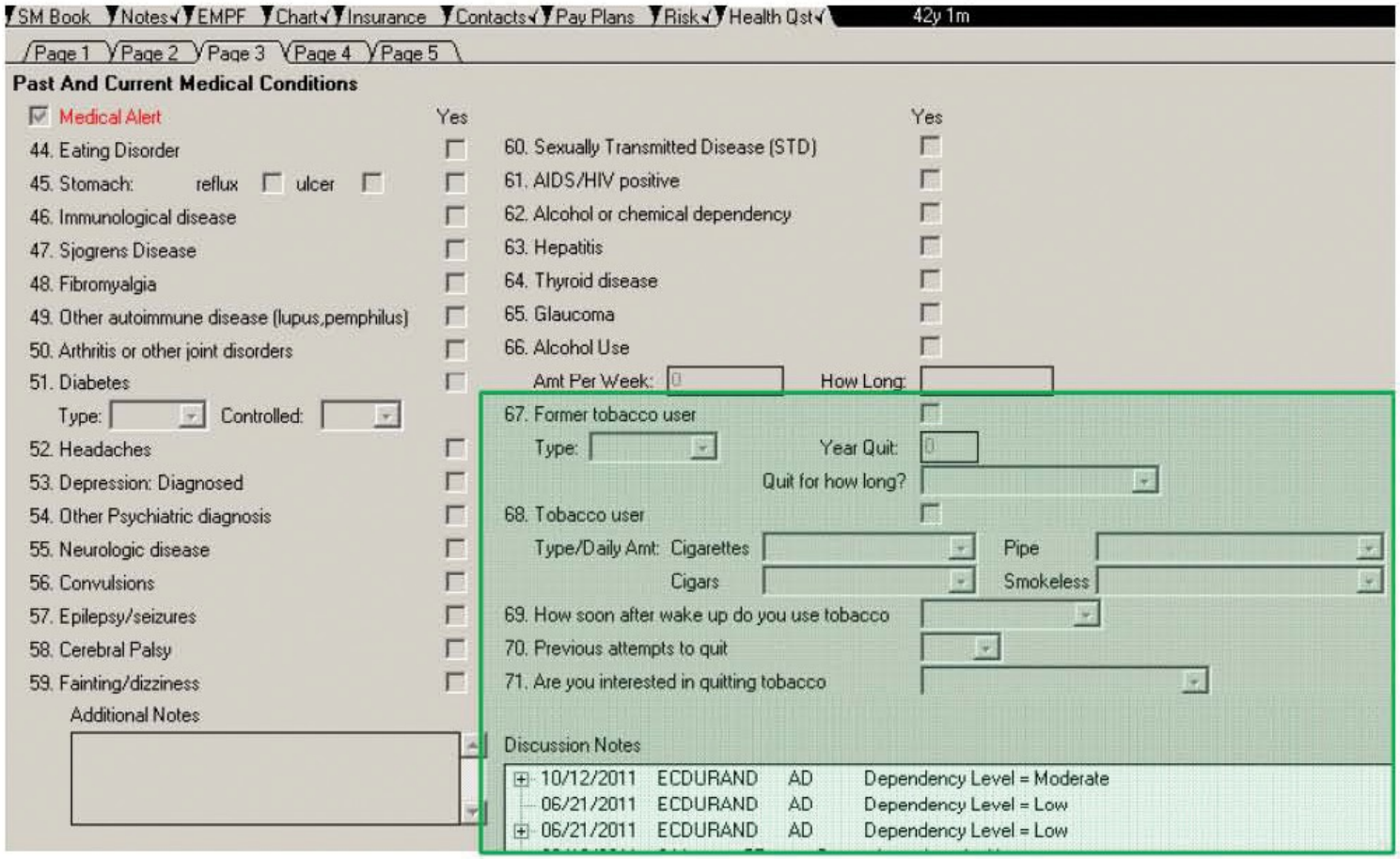
What do the results mean?

- Ask: we do a good job with identifying and documenting patient's smoking status
- Advise: encourage every tobacco user to quit
- Assess: providers can do better with asking their patient's willingness to quit smoking
- Assist: providers could do better with brief counseling, provide information on pharmacotherapy & refer to telephone counseling

Focus groups

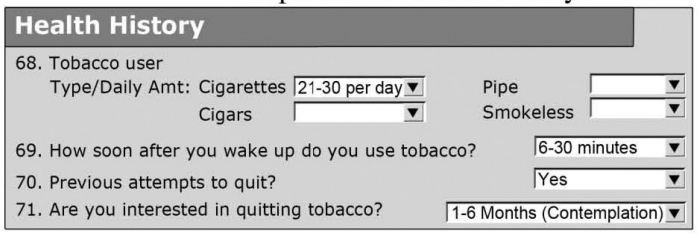
- Hygienists preferred to have all tobacco use questions in the health history section.
- Dentists preferred the tobacco dependence treatment to be chosen at the end of patient encounter.

Modified health history page

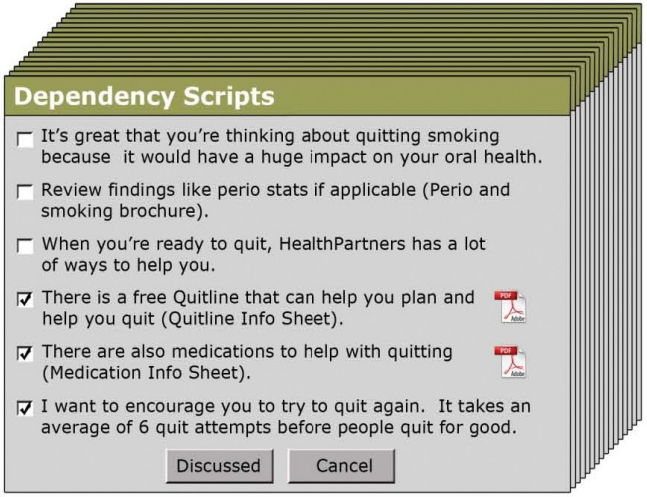


Provider scripts & tracking system for future reference

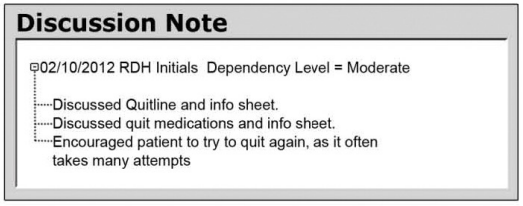
Tobacco use is assessed as part of a comprehensive health history.



A rules-based algorithm automatically generates a pop-up provider script (16 possible message combinations).



Clicking "Discussed" automatically documents dependency level and script use.



At next visit, discussion notes are reviewed as part of health history review.

Randomized controlled trial

- Aim 1: frequency of provider questions to **assess interest in quitting** utilizing CATI tool compared to usual care clinics without CATI tool
- Aim 2: frequency of provider delivered **brief tobacco cessation intervention and referral** using CATI tool
- Aim 3: assess **patient perceived value** of the provider-patient encounter regarding tobacco cessation counseling using CATI tool

Participant demographics

- 548 patients participated:
  - 263 intervention clinics
  - 285 usual care clinics
- 59% female, 88% white
- mean age: 46 years
- 60% of participants: 10 or less cigarettes/day
  - 54% moderate category of nicotine dependency

Patient survey: post visit

At your most recent visit, did your dentist/hygienist:	Smokers seen at 8 usual care clinics (n=285)	Smokers seen at 7 intervention clinics (n=263)	p-value
ask if you smoke or have ever smoked in the past?	96.8% (276/285)	97.7%	0.61
ask about your interest in quitting smoking?	**70.9% (200/282)**	**89.1%**	**0.0001**
talk about reasons to quit smoking?	68.4% (193/282)	78.2%	.104
talk about specific strategies to quit smoking?	**25.5% (72/282)**	**48.4%**	**.003**
refer you to a tobacco quit line?	**17.4% (49/282)**	**38.9% (100/257)**	**.007**

Providers' use of CATI

- hygienists: primary users of CATI
- customized & used the scripted messages
- patients accepted providers' advice:
  - openly discussed quit plans, previous quit attempts
  - failures, successes, side effects of quit medications

Lessons learned

- dependence & readiness to change:
  - disconnect between patient's answers & choices available
- previous tobacco assessments & recommendations not easily visible
- concerned about discontinuity of care: no feedback from quit-line
- patient's heightened sensitivity on billing & documentation of tobacco use status

Lessons learned

- practitioners prefer a team approach:
  - facilitates consistency in the approach & message
  - patients' awareness of the seriousness of the problem
  - reassurance of the support if he/she wants to quit
- time constraint: major factor for hygienists
  - easy to use, limited data entry, fits with clinic workflow
- ability to reuse tobacco information:
  - risk assessment for periodontal disease, oral cancer
- consider patient's perception about the tool & information provided

Significance of using a user-centered design approach

- user-centered design approach:
  - workflow observations
  - focus groups.
- helped in understanding how the dental team used EDR during patient care.
- facilitated integrating the use of CATI with the clinician's existing workflow.

Future work

- explore ways to capture patients' readiness to change reliably and accurately:
  - combination of structured data & narrative text
- seamless coordination across the dental team to provide a consistent message to the patient

What can dentistry contribute?

- dental providers would like to play a role in improving their patient's health
- health behaviors impact oral & general health
- integrate health behavioral measures into EHR:
  - provider support over time enables behavior change
  - messages tailored to patients are important
- educate future dental graduates on the importance of addressing patients' health behaviors

Other major works on tobacco use & interventions

- *RCT of Smoking cessation e-referrals among 100 National Dental PBRN practices:
  - higher referrals in intervention practices
  - higher quit rates: patients in intervention practices
- growing emphasis on interprofessional education:
  - focus on behavioral change such as smoking, diet

*Ray MN, Funkhouser E, Williams JH, Sadasivam RS, Gilbert GH, Coley HL, Rindal DB, Houston TK; National Dental PBRN Collaborative Group. Smoking-cessation e-referrals: a national dental practice-based research network randomized controlled trial. Am J Prev Med. 2014 Feb;46(2):158-65.

Ongoing projects

- integrating & implementing CATI with 2 EDR:
  - 2 dental schools
  - 16 private practices in the National Dental PBRN
- exploring the extent to which Network practices' data could be leveraged for research:
  - documentation of social history: smoking, alcohol, diet
  - 100 practices who use EagleSoft or Dentrix
  - recruited 65 practices since August 2016
- extracting patients' smoking status from EDR clinical notes

Potential impact on research

- Lessons learnt from implementing tobacco cessation interventions could be applied to integrate other health behavior measures:
  - alcohol, diet, obesity.
- More research is needed to ensure data capture:
  - is aligned with the clinical workflow
  - is reliable and accurate
  - does not cause excessive burden to clinicians
  - does not harm patients.

Potential impact on research

- enable peer support to provide consistent message to patients: dental, medical
- defining value of health behavioral change interventions:
  - clinicians
  - patients
- new models of incentives & reimbursement
- Integrating patient-generated health measures with the EHR/EDR

Conclusion

- Clinical practice guidelines and education alone will not help in integrating behavioral measures at the point of care.
- Implementation science and informatics research are needed.
- Behavioral change is a process and not an event!

Acknowledgements

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- D Brad Rindal, W. Rush, H. Spallek, L. Romito, J. Odonnell, T. Schleyer, M. Kirshner, R. Boyle, M. J. Thoele, S. E. Asche, E. M. Durand, C. S. Enstad, C. I. Huntley
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Thank you!

Questions?

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