Health Within Reach – An Interactive Video Patient Education Intervention to Increase Hepatitis B & C Screening Among Asian Americans in Primary Care

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Asian Americans

- Fastest growing racial group in the U.S.
  - 2/3 are immigrants including 43% do not speak English well

- Highest chronic hepatitis B virus (HBV) infection rate (18.9 per 100K)
  - >10 times the rate among non-Hispanic Whites in 2019

- Screening for HBV or HCV remain sub-optimal: > 50% had never been screened (up to 80% never been screened reported by Asian groups across studies)

Sources:
https://www.cdc.gov/hepatitis/statistics/2019surveillance/Table2.6.htm
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8462827/ (Le, Hong, Hui, Rimal & Juon, 2021)
Interventions To Increase Hepatitis B & C Screening Among Asian Americans

A Community-Based Randomized Trial of Hepatitis B Screening Among High-Risk Vietnamese Americans


Hue-Soo Joon, PhD; Sunmin Lee, ScD; Carol Strong, PhD; Rajiv Rimal, PhD; Gregory D Kirk, MD, PhD; Janice Bowie, PhD, MPH

Effect of a media intervention on hepatitis B screening among Vietnamese Americans

Janet N. Chu, Susan L. Stewart, Ginny Gildengorin, Ching Wong, Hy Lam, Stephen J. McPhee

Efficacy of a community-based participatory and multilevel intervention to enhance hepatitis B virus screening and vaccination in underserved Korean Americans

Grace X. Ma PhD, Minsun M. Lee PhD, Yin Tan MD, MPH, Alexander L. Hanlon PhD, Ziding Feng PhD, Theresa L. Shireman PhD, Joanne Rhe MSc, Zhengyu Wei PhD, Frank Wong PhD, Han Seung Koh BS, Charles Kim BS, Whitney York MS

First published: 13 November 2017
https://doi.org/10.1002/1555-7858.201672862
Interventions To Increase Hepatitis B & C Screening Among Asian Americans

Electronic Messages Increase Hepatitis B Screening in At-Risk Asian American Patients: A Randomized, Controlled Trial

Leeyen Hsu, Christopher L. Bowlus, Susan L. Stewart, Tram Thanh Nguyen, Julie Dang, Brian Chan & Moon S. Chen Jr.

Digestive Diseases and Sciences 58, 807–814 (2013) | Cite this article

Electronic health record alerts enhance mass screening for chronic hepatitis B

Eric Chak, Chin-Shang Li, Moon S. Chen Jr., Scott MacDonald & Christopher Bowlus

Scientific Reports 10, Article number: 19153 (2020) | Cite this article

RESEARCH ARTICLES | NOVEMBER 01 2018

Electronic Medical Alerts Increase Screening for Chronic Hepatitis B: A Randomized, Double-Blind, Controlled Trial

Eric Chak; Amir Taefi; Chin-Shang Li; Moon S. Chen, Jr; Aaron M. Harris; Scott MacDonald; Christopher Bowlus

Health Within Reach—a Patient-Centered Intervention to Increase Hepatitis B Screening Among Asian Americans: a Randomized Clinical Trial

Mandana Khalili MD, MAS; Nicole J. Kim MD, MPH, Janice Y. Tsao PhD, Judith M. E. Walsh MD, MPH, L. Elizabeth Goldman MD, MCR, Ginny Gildengorin PhD, Ching Wong BS, Mi T. Tran BA, Edgar Yu BS, Michael Thanh Sharp BA, Vivian H. LeTran BA, Vi-Van Nguyen BA & Tung T. Nguyen MD

Journal of General Internal Medicine (2022) | Cite this article
### Intervention Effects: Patient Education Interventions

<table>
<thead>
<tr>
<th>Study</th>
<th>Population</th>
<th>Intervention Details</th>
<th>N</th>
<th>Intervention AOR or RR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chen 2013 Hmong</td>
<td></td>
<td>Lay health worker, 3 home visits: HBV education vs. nutrition/physical activity education</td>
<td>260</td>
<td>3.5</td>
<td>1.3, 9.2</td>
</tr>
<tr>
<td>Juon 2014 Chn/ Kor/ Viet</td>
<td></td>
<td>30-minute education vs. brochure</td>
<td>877</td>
<td>5.1</td>
<td>3.2, 8.4</td>
</tr>
<tr>
<td>Bastani 2015 Korean</td>
<td></td>
<td>1 session, small group, church-based vs. nutrition/physical activity education</td>
<td>1,123</td>
<td>4.9</td>
<td>2.4, 9.9</td>
</tr>
<tr>
<td>Ma 2017 Vietnamese</td>
<td></td>
<td>2-hour Community health education 1 group session + patient navigation vs. general cancer education</td>
<td>2,337</td>
<td>RR = 18.6</td>
<td>13.7, 25.2</td>
</tr>
<tr>
<td>Ma 2017 Korean</td>
<td></td>
<td>2-hour Community health education 1 group session + patient navigation vs. general cancer education</td>
<td>1,834</td>
<td>512.3</td>
<td>105.2, 1344.5</td>
</tr>
<tr>
<td>Chu 2022 Vietnamese</td>
<td></td>
<td>Mass media campaign - Exposure to elements of mass media in association with Hep B screening</td>
<td>1,666</td>
<td>1.3</td>
<td>1.2, 1.3</td>
</tr>
</tbody>
</table>
# Intervention Effects: Electronic Health Record-Based

<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention Description</th>
<th>N</th>
<th>Intervention Vs. Control</th>
<th>95% CI</th>
</tr>
</thead>
</table>
| Hsu 2012 (Chinese/Vietnamese) | **EHR-based provider prompts** 24-hr before patient’s scheduled appointment vs. Usual Care  
Outcome: 3-month post, HBsAg Test completed | 175 | 34% vs. 0%               | NA           |
| Chak 2018 (AAPI)              | **EHR alert** was deployed through the health system's electronic record (Epic Systems) under the “Health Maintenance” functionality  
Outcome: 1-year, HBsAg Test completed | 2,987 | 8% vs. 3.2%  
aOR = 3.1 | 2.2, 4.5     |
| Chak 2020 (AAPI)              | **EHR alert** (same as Chak 2018)  
Cohort 1 (privately insured)  
Cohort 2 (Medical Medical)  
Outcome: 3-year, HBsAg Test completed | 3,010  
2,599 | OR = 2.3  
OR = 2.8 | 1.9, 2.8  
2.0, 4.0 |
| Khalili 2022 (AAPI)           | **20-minute Video Doctor + Provider Alert + Panel Notification** vs. Panel Notification  
Outcome: 3-month post-intervention, HBsAg Test completed | 452  | 38% vs. 9.9%  
aOR = 7.5 | 3.6, 15.5 |

**Note:** aOR = Adjusted Odds Ratio
Health Within Reach: Multilingual Video Doctor

- Using stakeholder-engaged methods, we developed an iPad app in English, Cantonese, Vietnamese, and Mandarin

- Evaluate the efficacy of the Video Doctor + Provider Alert intervention + Provider Panel Notification vs. Provider Panel Notification to increase hepatitis B & C screening in 2 healthcare systems through a cluster randomized controlled trial (RCT)
Multilingual Video Doctor (Hepatitis B & C Education):

Assessments

A simple blood test that uses a small amount of blood can tell if you have hepatitis B. Have you had a hepatitis B test?

- Yes
- No
- Not Sure

Would you like to know some tips on how to talk to your doctor about hepatitis B?

- Yes
- No
- Not Sure

一個簡單的驗血檢查，只須抽取少量血液，就能知道您有否患上B型(亦稱乙型)肝炎。

您是否做過B型肝炎檢查？

- 是
- 不是
- 不確定

Một xét nghiệm máu đơn giản chỉ dùng một lượng nhỏ máu để có thể cho biết bạn bị bệnh viêm gan B hay không.

Bạn đã làm thử nghiệm viêm gan B chưa?

- Có
- Không
- Không Chắc Chắn
Multilingual Video Doctor
(Hepatitis B & C Education):

Responsive Messaging & Provider Alert

Video Program Demonstration and Description:
Multilingual Video Doctor (Hepatitis B & C Education):

Provider Alert Example

**FOR THE PATIENT**

Date: ____________  Name: ____________

We recommend that you:
- Ask your doctor for a hepatitis B test.
- Ask your doctor for a hepatitis C test.

Your current situation that needs attention:
- Hepatitis B: You have not been tested for this. You should get tested for hepatitis B.
- Hepatitis C: You may be at risk for this. You should get tested for hepatitis C.

You just watched videos that addressed:
- Hepatitis B: transmission, symptoms, outcomes, screening, and your questions.
  - Whether hepatitis B is a serious disease.
  - Whether you may have hepatitis B.
  - Whether anything can be done about hepatitis B.
  - Whether people avoid those who have hepatitis B.
  - Whether you have too many other problems to worry about hepatitis B.
- Hepatitis C: transmission, symptoms, outcomes, screening, and your questions.
  - Whether hepatitis C is a serious disease.
  - Whether you may have hepatitis C.
  - Whether anything can be done about hepatitis C.
  - Whether people avoid those who have hepatitis C.

If you still have questions, please discuss them with your doctor.

**FOR THE DOCTOR/NURSE PRACTITIONER **

Your patient has the same copy of this printout in his/her language. This is for your information only.

- Screen this patient for hepatitis B with the hepatitis B surface antigen & hepatitis B surface antibody tests.
- Patient stated that he/she has a risk factor for hepatitis C or was born between 1945 and 1965. Screen this patient with the hepatitis C antibody test.

Notes to Providers:
- Hepatitis B: The USPSTF recommends that this patient be tested for hepatitis B because he/she is from an endemic area or has risk factors.
- Hepatitis C: The USPSTF recommends that everyone born between 1945 and 1965 and those with a risk factor should be tested once for hepatitis C. The risk factors include: history of injection drug use, blood transfusion before 1992, history of hemodialysis, being born to an HCV-infected mother, incarceration, intranasal drug use, tattoo, other percutaneous exposures, high-risk sexual behaviors (multiple sex partners, unprotected sex, or sex with an HCV-infected person or injection drug user), those who are HIV positive, or those who have abnormal liver function tests. If the hep C antibody test is positive, order a hep C viral load to confirm active infection.
Control App:
Nutrition, Physical Activity, & Healthy Weight

At least half of what we eat daily should be vegetables and fruits.

Agree  Disagree  Not Sure

Based on what you entered and the recommendations for Asians, your weight is in the Overweight Range (24.0 BMI). Your healthy weight range is 111.2 lbs - 137.6 lbs
Study Design: Cluster Randomized Trial

- Primary care providers (PCPs) and their patients at two health systems were cluster randomized to the intervention or a comparison arm that received an app addressing viral hepatitis screening prior to a PCP visit.

- Patient eligibility:
  - Asian Americans
  - age 18+
  - spoke one of these languages (English, Cantonese, Mandarin or Vietnamese)
  - Had no hepatitis B screening on electronic medical record (EHR)
  - Had an upcoming PCP visit

- Recruitment: patients identified via EHR were contacted by postal mailing, telephone or in-person to confirm eligibility and interest for participation.

Trial Registration: ClinicalTrials.gov NCT02139722
Data Sources

- **Patient survey data**: at Pre-intervention, Immediate post-visit, Post-intervention at 3-months
- **Primary outcome**: Electronic Health Record documentation of hepatitis B & C screening at 3-month post-intervention
- **Analyses**: descriptive statistics, bivariate and multivariable logistic regression models using GEE to account for PCP clusters
Primary Care Providers (PCP) And Patient Participants By Treatment Group (N=452)

Patient Participants (N=452) of 122 PCPs

Intervention: Hepatitis
Patients (n=270) of 70 PCP

Comparison: Nutrition/Physical Activity/ Healthy Weight
Patients (n=182) of 52 PCP
## Patient Participants Characteristics (N=452)

<table>
<thead>
<tr>
<th></th>
<th>Hepatitis (n = 270)</th>
<th>Nutrition &amp; Physical Activity (n = 182)</th>
<th>Total (n = 452)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site, academic %</td>
<td>60.0</td>
<td>59.9</td>
<td>60.0</td>
</tr>
<tr>
<td>Mean age in years (SD)</td>
<td>57.5 (16.8)</td>
<td>55.8 (17.0)</td>
<td>56.8 (16.8)</td>
</tr>
<tr>
<td>Female, %</td>
<td>60.0</td>
<td>69.8</td>
<td>64.0</td>
</tr>
<tr>
<td>Married/Partner, %</td>
<td>49.6</td>
<td>43.4</td>
<td>47.1</td>
</tr>
<tr>
<td>High school or less education, %</td>
<td>31.5</td>
<td>23.9</td>
<td>28.4</td>
</tr>
<tr>
<td>Annual income &lt; $20,000, %</td>
<td>31.5</td>
<td>38.6</td>
<td>40.3</td>
</tr>
<tr>
<td>Speak English so-so/poorly/not at all, %</td>
<td>47.3</td>
<td>44.5</td>
<td>43.8</td>
</tr>
<tr>
<td>Born outside of US, %</td>
<td>81.1</td>
<td>77.5</td>
<td>79.7</td>
</tr>
<tr>
<td>Excellent/Very good self-rated health, %</td>
<td>29.3</td>
<td>24.7</td>
<td>27.4</td>
</tr>
</tbody>
</table>
Usability and Patients’ Feedback

- 84% liked the Hepatitis App “very much” or “somewhat”
- 59% gave the printout to their providers
- 95% found printout was “helpful” for talking with their provider
Results
EHR Order and Receipt Of Hepatitis B & C Screening 3 Months Post-Intervention

- Hepatitis B Surface Antigen test done:
  - Intervention: 37.8%
  - Comparison: 7.7%
  - P<0.001

- Hepatitis B Surface Antigen test ordered:
  - Intervention: 44.1%
  - Comparison: 9.9%
Results
EHR Order and Receipt Of Hepatitis B & C Screening 3 Months Post-Intervention

<table>
<thead>
<tr>
<th>Test</th>
<th>Intervention</th>
<th>Comparison</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis C antibody test done</td>
<td>30.3</td>
<td>6</td>
<td>44.1</td>
</tr>
<tr>
<td>Hepatitis C antibody test ordered</td>
<td>38.6</td>
<td>10</td>
<td>37.8</td>
</tr>
<tr>
<td>Hepatitis B Surface Antigen test done</td>
<td>37.8</td>
<td>7.7</td>
<td>44.1</td>
</tr>
<tr>
<td>Hepatitis B Surface Antigen test ordered</td>
<td>44.1</td>
<td>9.9</td>
<td>37.8</td>
</tr>
</tbody>
</table>

P<0.001
### Intervention Effects: Multivariable Models

<table>
<thead>
<tr>
<th>Intervention</th>
<th>AOR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B Test Done within 3 months (N=452)</td>
<td>7.5</td>
<td>3.6, 15.5</td>
</tr>
<tr>
<td>Hepatitis C Test Done within 3 months (birth cohort/ other risk factors, N=179)</td>
<td>10.5</td>
<td>3.0, 36.8</td>
</tr>
</tbody>
</table>

Note: Multivariable logistic regression model used GEE to adjust for PCP clusters. Other covariates included in the model participants’ clinic site, age, gender, nativity, education, employed, English proficiency, income, self-rated health, healthy literacy, spoken languages.
Conclusion

- A multilingual mobile application for patient education was well received by Asian American patients, which led to increased hepatitis B & C screening

https://doi.org/10.25302/02.2020.AD.12114615

https://doi.org/10.1007/s11606-021-07232-3
Leveraging clinical visits with technology designed via a patient-centered approach can be easily used by minority patients, even among older and those with limited English proficiency, can improve hepatitis screening among Asian Americans.

Targeted interventions for Asian Americans need to attend to psychosocial needs that may differ across Asian cultural groups.

To reduce hepatitis-related health disparities, multi-pronged approaches involving integrated and coordinated efforts among stakeholders, community and practice-based partners are needed.
Acknowledgements

Authoring Team: Tung Nguyen (PI); Mandana Khalili; Nicole Kim; Judith Walsh; L. Elizabeth Goldman; Ginny Gildengorin; Ching Wong; Mi Tran; Edgar Yu; Michael Sharp; Vivian LeTran; Vi-Van Nguyen.

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Thank You

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At least half of what we eat daily should be vegetables and fruits.

Agree  Disagree  Not Sure

We eat at least half of what we eat daily should be vegetables and fruits.

同意  不同意  不確定
Multilingual mHealth Patient Educational Tool

We should do at least 150 minutes of physical activity weekly.

Agree  Disagree  Not Sure

Chúng ta nên vận động cơ thể ít nhất 150 phút mỗi tuần.

Đồng Ý  Không Đồng Ý  Không Chắc Chân

Vận Động Cơ Thể

30 phút mỗi ngày x 5 ngày mỗi tuần = 150 phút mỗi tuần

Méo Vặt

• Đi bộ với bạn hoặc người nhà
• Kể hoạch cho ngày mưa hoặc lạnh
• Bao gồm vận động cơ thể như là một thói quen hàng ngày
Multilingual mHealth Patient Educational Tool

Do you want to know the healthy weight range for you?

Yes  No

The Weight Ranges for Asian Americans

Based on what you entered and the recommendations for Asians, your weight is in the Overweight Range (24.0 BMI). Your healthy weight range is 111.2 lbs - 137.6 lbs

Underweight  Healthy  Overweight  Obese

Your Weight:

111.2 - 137.6 lbs

Next
Provider Alert

**FOR THE DOCTOR/NURSE PRACTITIONER**

Your patient has the same copy of this printout in his/her language. This is for your information only.

- Tell the patient his/her healthy weight range for Asian Americans.
- Answer any question about the appropriate diet for the patient.
- Recommend the appropriate level of physical activity for the patient.

**Notes to Providers:**

- **Healthy Diet:** The CDC’s "MyPlate" recommendations are:
  - Eat the appropriate amount of 5 food groups (vegetables, fruits, protein, grains and dairy)
  - Half of the food eaten daily should be fruits and vegetables
  - Eat less salt, sugar, and fat

- **Physical activity:** The CDC recommends moderate physical activity (breathing harder than normal, heart beating faster than normal, or sweating) for at least 30 minutes daily for 5 days a week or 150 minutes a week total.

- The World Health Organization recommends using modified Body Mass Index (BMI) cutoffs for Asians because they develop obesity-related diseases at a lower BMI. The healthy weight range for this patient is in the "current situation" box above.

<table>
<thead>
<tr>
<th>Underweight</th>
<th>Healthy Weight</th>
<th>Overweight</th>
<th>Obese</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI &lt; 18.5</td>
<td>BMI 18.5-22.9</td>
<td>BMI 23.0-27.4</td>
<td>BMI &gt; 27.5</td>
</tr>
</tbody>
</table>