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# Conference Report:

# International Conference on Betel Quid and Areca Nut

## Kuala Lumpur, Malaysia

## April 27-28, 2016

**Co-sponsored by:**

*Taiwan Health Promotion Administration, Ministry of Health and Welfare, Taiwan*
*The University of Texas at MD Anderson Cancer Center, USA*
*University of Malaya, Malaysia*
*US National Cancer Institute (NCI), USA*
*US National Dental and Craniofacial Research (NIDCR), USA*

**In partnership with:**

*Healis- Sekhsaria Institute for Public Health, India*
*International Agency for Research on Cancer (IARC), France*
*Kaohsiung Medical University, Taiwan*
*King's College London, WHO Collaborating Centre for Oral Cancer, United Kingdom*
*Ministry of Health Malaysia*
*National Institute on Drug Abuse, National Institutes of Health, USA*
*National Health Research Institutes, Taiwan*
*New York University College of Dentistry, USA*
*University of Hawaii, USA*
*University of Florida, USA*
*University of Minnesota, USA*
*Public Health Foundation, India*
*SmileLink Dental Group Malaysia*
*The University of Malaya, Malaysia*
*US Centers for Disease Control (CDC), USA*
*US Department of Defense, USA*
*WHO Regional Office for the Western Pacific (WPRO), Philippines*

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# Overview

The inaugural International Conference on Betel Quid and Areca Nut was held in Kuala Lumpur, Malaysia, April 27-28, 2016, at Le Meridien Kuala Lumpur, and was co-sponsored by the US National Cancer Institute Center for Global Health (NCI), the US National Institute of Dental and Craniofacial Research (NIDCR), the University of Texas, MD Anderson Cancer Center (MDACC), the Oral Cancer Research Coordinating Center, University of Malaya (OCRCC) and the Taiwan Health Promotion Administration, Ministry of Health and Welfare, with the generous support of the Ministry of Health of Malaysia. This first-of-its kind conference aimed to gather international experts in areca nut (AN) and betel quid (BQ) to gain a greater understanding of the health impact of human use of areca nut and betel quid, both with and without tobacco. BQ use prevalence is high in many South East Asian and Western Pacific Countries, is a risk factor for oral and esophageal cancers, and has shown effects on the cardiovascular, nervous, GI and metabolic, respiratory, and reproductive systems. More research is critically needed to understand and implement effective prevention, cessation and control of BQ; improve and implement screening and treatment for BQ-related cancers; and evaluate the policy and economic impacts of AN and BQ.

The conference was held over two days, and attended by over 130 participants from 21 different countries. Conference attendees came from a variety of different backgrounds including: academia, health care professionals, government agencies and nonprofits. The main objectives of the conference were to: identify research priorities and unanswered research questions regarding the use of AN/BQ and cancer; identify evidence-based strategies for prevention and control; share relevant research findings from the field and highlight particular country examples of the translation of evidence to policy; build a network of BQ researchers and stimulate new research in the field and strengthen capacity among researchers in LMICs.

Conference plenary sessions covered six main areas: 1) basic biology of BQ-related disease; 2) epidemiology of BQ use; 3) factors that influence BQ use and dependence, including the biology of addiction; 4) prevention and control of AN/BQ use (including cessation); 5) screening and early diagnosis of BQ-related cancers; and, 6) policy Interventions and economic impacts of BQ use. In addition, concurrent breakout sessions were held to give participants the opportunity to work in groups to identify gaps in current BQ research. During each of the conference plenary sessions, participants had time to work in groups to develop research recommendations for a particular area of focus. The final research recommendations developed are described below for each of the sessions.

This conference also featured the first international abstract session on BQ and AN research. Abstracts for the conference were reviewed for scientific merit and for how well the research impact could address the burden of BQ disease. Among the 52 submissions, there were 46 accepted abstracts and 31 poster presentations.

# Research Recommendations

**The biology, disease, and epidemiology session** prepared four recommendations for future areas of research. First, participants of this session recommended new multi-center and inter-country studies to describe detailed and comprehensive prevalence of BQ and AN use. Second, the group recommended increased focus on qualitative research to build a greater understanding of the cultural and social norms that enforce use of BQ and AN. This knowledge will be critical in order to understand how to design effective prevention and intervention campaigns. Third, the group recommended conducting more human studies on the carcinogenicity of AN to further support the 2004 IARC evaluation on AN carcinogenicity. Fourth, the group recommended systematic study of AN products, in order to better understand the types and amounts of ingredients (and their associated chemical constituents) found in these products.

**The prevention, addiction and dependence session** highlighted five areas of research that should be further addressed in order to advance understanding in this area. These research recommendations have some overlap with recommended research from the biology, disease, and epidemiology session. First, there is a need to understand the biological basis of BQ dependence. Second, more studies are needed to determine the motivations behind BQ use. Third, the different patterns of AN use among distinct populations need to be characterized. Fourth, the role of healthcare providers in prevention and cessation interventions for BQ and AN need to be better defined. Finally, BQ/AN prevention campaigns need to be evaluated for impact and targeted interventions for BQ/AN cessation need to be developed. Moreover, more data is needed to evaluate the trajectory of adolescent BQ and AN use with or without tobacco and alcohol.

**The screening and early diagnosis session** developed two major research recommendations to address the lack of national screening programs in low- and middle-income countries (LMICs). Firstly, healthcare workforces in LMICs should be assessed to determine which healthcare professions and healthcare facilities are best suited to carrying out hospital-based and national screening programs. Second, formal evaluations need to be conducted on existing national screening programs in Taiwan and Malaysia, to provide information on the successes and challenges of screening program implementation in these countries.

**The policy interventions and economics of betel quid and areca nut session** stressed the importance of addressing the regional and country-level policy issues that surround BQ and AN use and production. In terms of country efforts, in-country consultations on BQ and AN can mobilize support for BQ/AN policy interventions and research. Several countries have already implemented policies for smokeless tobacco; however, ongoing evaluation of implementation and enforcement of these policies is needed. Regionally, BQ and AN biannual policy consultations can produce action plans and motivate the establishment of a bi-regional alliance or network for policy advocacy and research. A balanced and comprehensive mix of supply and demand reduction strategies, patterned after MPOWER, will be essential to drive the efforts forward.

These research focus areas demonstrate how understanding and addressing BQ/AN use is truly a multidisciplinary challenge and requires engagement of stakeholders with diverse expertise. In order to reduce the burden of BQ-related disease, future research and collaboration are needed to advance understanding of basic biology, mechanisms, and epidemiology of BQ/AN use, and create evidence-based screening, diagnosis, prevention and cessation programs for BQ/AN users.

The key areas identified for follow up post-conference include:
- The development of a priority action plan for future areas of BQ/AN research;
- The development of fundable and deliverable research themes to encourage multi-center and inter-country research on areca nut-related health issues, prevention and cessation programs;
- A follow-up meeting in parallel with the 2017 Economist Health Care Forum meeting will focus on the economics of betel leaf and areca nut growth;
- Publishing and developing both a commentary and manuscript for conference findings;
- Working with external partners to identify other funding channels for LMIC investigators including small grants.

Going forward, we hope conference attendees and researchers in this field will work collaboratively to achieve progress in these areas for follow-up. The conference sponsors will also work to determine when and how they can engage the betel-quid research community in future activities.

## Sessions Overview

## Biology, Disease and Epidemiology

**Leadership Team**

**Session Chairs:**

Dr. Prakash C. Gupta, Healis - Sekhsaria Institute for Public Health, India

Professor Saman Warnakulasuriya OBE, WHO Collaborating Centre for Oral Cancer and Pre-cancer/ King's College London, United Kingdom

**NCI Contact:** Kalina Duncan, Center for Global Health, National Cancer Institute

**Summary**

The Biology, Disease and Epidemiology of Betel-Leaf and Areca Nut session, led by Professor Saman Warnakulasuriya and Dr. Prakash Gupta, provided participants with an update on the current scientific casual links between BQ/AN use and disease, and specifically to potential causation of oral cancers. The epidemiology discussions provided an understanding of what we currently know about use patters, disease burden related to use, and etiology of disease. This session focused on wide-ranging topics, from product composition and relation to disease, to ethnic and socio-cultural norms related to use, and how existing evidence can be applied to shape effective interventions in the future. Additionally, speakers in this session challenged meeting participants to think of new research approaches to update and add to the current evidence base.

The plenary session presentations for this session were "Oral consequences of areca nut products" by Dr. Ross Kerr from New York University, "The carcinogenicity of areca nut and the attributable burden of cancer" by Dr. Kurt Straif from the International Agency for Research on Cancer, and "Characteristics of Betel Quid Chewers in India and Bangladesh -- And some less researched health effects" Dr. Prakash Gupta, the Healis-Sekhsaria Institute for Public Health, India.

The breakout session provided an opportunity for five discussion groups to create research plans to address important areas of biology and epidemiology.

**Methodology**

The breakout session was a facilitated discussion, involving five groups of participants. Each group had the opportunity to deliberate on a research topic (listed below) to come up with a short research protocol. Participants were instructed that the protocol should be deliverable in the region where they presently work. There were 20 minutes allocated for group work and 10 minutes for each presentation. From this discussion, session chairs developed an action plan identifying priority research areas for future research.

Facilitators:

1.  Dr. Prakash C. Gupta, Healis - Sekhsaria Institute for Public Health, India
2.  Dr. Ross Kerr, New York University
3.  Dr. Kurt Straif, International Agency for Research on Cancer (IARC), France

4. Professor Saman Warnakulasuriya OBE, WHO Collaborating Centre for Oral Cancer and Pre-cancer/ King's College London, United Kingdom
5. Dr. Irina Stepanov, University of Minnesota

**Results**

The potential research projects and current gaps in the state of science in the field of Biology, Disease and Epidemiology that were developed at the breakout sessions are outlined below.

- Research Question 1: Global epidemiology of AN use confirms distinct ethnic and cultural preferences. There is a social meaning and a cultural identity to the habit and why people continue to use it. How would you explore these social aspects of AN use so that the findings may benefit future social marketing programs tailored for interventions?

  Suggested research approach: An epidemiological study to characterize ethnic, cultural and social aspects of BQ/AN use in several countries in the region under various settings: A multi-center study.
    - *Proposed Primary Investigator:* Dr. Apeksha Mainali (Nepal)
    - *Timeline*: 2 years from initiation of literature review to completion of the study. 6 months would be spent on a literature review and developing the research protocol, and 1.5 years would be spent conducting the epidemiological study
    - *Resources needed*: Funding, Co- primary investigators in each country, ethical clearance, one statistician

- Research Question 2: AN is chewed for its psychological stimulating effects by over 600 million users worldwide. AN chewing is reported to have varied and widespread, predominantly stimulant effects. Many users also claim a medicinal value attributable to chewing BQ. How would you set about to gain knowledge and reliable data on the personal beliefs attributable to the BQ/AN chewing in a given population?

  Suggested research approaches:
    - Perceived medicinal values, psychosocial beliefs, religious importance and method of use in different communities/ countries;
    - Beliefs and perception of religious leaders and how it can influence prevention and cessation programs;
    - Epidemiology of beliefs of migrants' vs locals;
    - Perceived medicinal value in pregnancy and effect on reproductive health including pregnancy outcome and long term health of the offspring.
      - *No Primary Investigators, timeline, or resources needed were identified*

- Research Question 3: Squamous cell carcinomas (SCC) arising in patients who have had Oral Submucosa Fibrosis(OSF) may be different in many ways to SCC arising from other oral potentially malignant disorders (OPMDs) or those arriving *de novo*. How would you set about to explore any clinicopathological or biological differences of these tumors?

Suggested research approach:
- Develop and conduct a prospective study that answers this research question: Do AN-using patients with OSF who develop squamous cell carcinomas (SCC) have a better survival compared with SCC originating from other OPMDs or arising *de novo*
  - *Primary Investigator:* Dr. Pankaj Chaturvedi, TATA Memorial Hospital
  - *Timeline*: 2-5 years to conduct a prospective study
  - *Resources Needed*: Funding to add to existing TATA Memorial Hospital project and identify other cancer centers in the region that can contribute to the project.

- Research Question 4: IARC evaluation on carcinogenicity of the AN was mainly derived from Taiwanese data. Develop a protocol to gain more evidence to support (or refute) the IARC evaluation in other populations in the region.

  Suggested research approach:
  - Case-control and cohort studies on populations who do not add tobacco to BQ
    - *No Primary Investigators, timeline, or resources needed were identified*

- Research Question 5: Areca nut is used in a variety of forms and formulations worldwide. Some product characteristics, such as the degree of nut ripeness, method of processing, and presence of additional ingredients may affect its chemical composition and the resulting toxicity and carcinogenicity. How would you set about to examine any variations in health risks associated with the use of different product formulations?

  Three different research approaches were suggested:
  - A systematic study of AN products and their composition – types and amounts of ingredients and associated chemical constituents.
    - *Proposed Primary Investigator:* Dr. Irina Stepanov, University of Minnesota
    - *Timeline*: within 1 year
    - *Resources Needed*: Funding to collect information on ingredients and to run chemical analyses
  - Development of robust biological models (in vitro and animal) for comparative toxicological assessment of various product formulations.
    - *Proposed Primary Investigator:* Dr. Reinhold Penner, University of Hawaii Cancer Center
    - *Timeline*: up to 5 years
    - *Resources Needed:* Research grant support
  - A study to investigate exposures and effects in users of various AN products, with the specific research aims of characterizing patterns of use and identifying and measuring biomarkers.
    - *Proposed Primary Investigators:* Dr. Irina Stepanov, University of Minnesota & Dr. Adrian Franke, University of Hawaii

        o   *Timeline*: up to 5 years
        o   *Resources Needed*: Research grant support

**Priority Research Areas**

The Biology, Disease and Epidemiology group concluded by defining four main areas to pursue an agenda in this field. These research priorities are outlined below.

1. Establish multi-center and inter-country studies to describe the prevalence of BQ/AN use, including a renewed assessment of who uses it, reasons why, and in what form.
2. Pursue qualitative research for a greater understanding of the cultural and social norms that enforce use of BQ/AN, in order to understand how to design effective prevention and intervention campaigns.
3. Conduct human studies to confirm carcinogenicity of AN outside Taiwan, and further support the IARC evaluation.
4. Perform systematic studies of AN products to determine the types and amounts of ingredients and associated chemical constituents.

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## Prevention, Addiction and Dependence

**Leadership Team**

**Session Chairs:**

Dr. Ellen R. Gritz, Department of Behavioral Science, The University of Texas, MD Anderson Cancer Center, United States

Professor Dr. Amer Siddiq Bin Amer Nordin, Department of Psychological Medicine, Faculty of Medicine, University of Malaya

Dr. Mark Parascandola, Tobacco Control Research Branch, National Cancer Institute, National Institutes of Health, United States

**NCI Contact:** Dr. Mark Parascandola, Tobacco Control Research Branch, National Cancer Institute, National Institutes of Health, United States

**Summary**

The Prevention, Addiction, and Dependence of Betel-Leaf and Areca Nut session, led by Dr. Ellen Gritz, Professor Amer Siddiq Bin Amer Nordin and Dr. Mark Parascandola, summarized the state of the science of BQ and AN-associated oral cancers.  This session described the link between BQ and nicotine addiction (with the properties of arecoline) and oral cancer prevention in the Asia-Pacific Region. In addition, current and future treatments for tobacco and BQ use were covered in the session.

The plenary session presentations for this session were "Oral Tobacco and Areca Nut Use: Current and Future Treatments" by Dr. Dorothy Hatsukami from University of Minnesota, "Oral Cancer Prevention: Research in the Asia-Pacific Region" by Dr. Thaddeus Herzog from the University of Hawaii Cancer Center, and "Properties of arecoline suggest links between betel quid use and nicotine addiction" by Dr. Roger Papke from the University of Florida.

**Methodology**

The session co-chairs selected four poster presenters to give brief oral presentation (5 minutes each) to provide participants with examples of current research projects in the field. Two moderated discussions followed the poster presenters. The purposes of these discussions were to: 1) identify research gaps around BQ/AN prevention, addiction and cessation; and 2) identify priority research questions and specific action steps needed to answer these research questions.  Action steps could include proposals for specific studies or research designs that would yield relevant data as well as suggestions for training or infrastructure that would support collaboration for control of BQ/AN.

Facilitators:

1. Dr. Ellen R. Gritz, The University of Texas, MD Anderson Cancer Center
2. Professor Dr. Amer Siddiq Bin Amer Nordin, University of Malaya
3. Dr. Mark Parascandola, National Cancer Institute, National Institutes of Health

**Results**

The group developed several observations and research recommendations about the current state of research:

- The group suggested that BQ/AN researchers should evaluate the research history of tobacco on health, and draw from lessons learned in this field.
  - Recommendations:
    - Develop a clearinghouse for sharing tools and resources (i.e. dependence scale, survey questions, and lab protocols) from current BQ/AN field researchers, including tools that have been useful in research on the links of tobacco and health.

- The group emphasized that research on interventions must be informed by the community. There is a need for participatory action research and user driven interventions.
  - Recommendations:
    - Develop Tobacco Questions for Surveys (TQS) to provide a standard set of questions on BQ and AN use, and key BQ and AN measures with community-based input, that can be implemented in local/regional setting. This could be a separate survey or a short module that could be added onto an existing survey performed in these at-risk communities. The current WHO STEPwise approach to Surveillance (STEPS) Survey and WHO Global youth tobacco survey (GYTS) for Palau have some questions that may be relevant to use in this new survey.

- While interventions exist for smokeless tobacco use, the group cautioned that most of this work comes from high income countries and may not be directly applicable to BQ/AN use. BQ use has strong cultural associations in some locations and it is therefore important to consider cultural, geographic and gender differences when conducting research.
  - Recommendations:
    - Conduct an evidence review of existing prevention activities and cessation interventions in applicable LMIC settings.
    - Evaluate mHealth programs in betel quid users and consider illiterate populations.

- Continuing spread of products and practices into new regions/cultures through migration and promotion is a challenge and must be addressed. The existence of a wide variety of BQ/AN products and practices adds to complexity of studying behavior and interventions.
  - Recommendations:
    - Formally catalog BQ/AN products by region, user population and ingredients.

- There is a lack of awareness among healthcare providers regarding prevention and cessation for these BQ and AN products that can be a barrier to research and implementation of prevention and cessation programs.
  - o Recommendations:
    - Develop BQ training for health professional schools to provide awareness of BQ associated health effects and develop prevention activities that can be implemented by providers.

- There is a need for targeted research on use among children and adolescents from a very young age.
  - o Recommendations:
    - Determine the trajectory of adolescent BQ/AN use (along with tobacco and alcohol) which can build on experience with combustible tobacco and smokeless tobacco.

- There is a lack of basic science to understand addiction and dependence in BQ/AN users.
  - o Recommendations:
    - Determine the role of specific chemicals through animal models and the similarities and differences to nicotine dependence potentially through the role of pharmacotherapy.

**Priority Research Areas**
The Prevention, Addiction and Dependence group's priorities for research are summarized below.

1. Carry out studies to better understand the biological basis of betel quid dependence.
2. Examine the behavioral motivations behind betel quid use with social network analyses to understand peer influence which will in turn help inform treatment and cessation strategies for BQ/AN.
3. Perform studies to characterize different patterns of areca nut use across distinct populations.
4. Establish prevention and cessation interventions that include: 1) evaluation of existing prevention campaigns and messages 2) defining the role of healthcare providers in prevention and cessation interventions, and 3) development and evaluation of targeted interventions for betel quid cessation.

## Screening and Early Diagnosis of Oral Cancers

**Leadership Team**

    **Session Chairs:**

    Professor Ravi Mehrotra, Director, National Institute of Cancer Prevention and Research, India

    Professor Rosnah Binti Mohd Zain, University of Malaya Oral Cancer Research and Coordinating Centre (OCRCC), Malaysia

    **NCI Contact:** Ms. Hedieh Mehrtash, Center for Global Health, National Cancer Institute

**Summary**

The Screening and Early Diagnosis of Oral Cancers session, led by Dr. Rosnah Zain and Dr. Ravi Mehrotra, provided an insight into current early detection programs for oral cancers in the region. The plenary presentations for this session were "National Oral Cancer Screening Program in Taiwan" by Dr. Shu-Ti Chiou, former Director General of Health, Taiwan Health Promotion and Administration, and "Primary Prevention & Early Detection of Oral Cancer Programme in Malaysia" by Dr. Noor Aliyah bt Ismail, Director Oral Health, Ministry of Health Malaysia who presented case studies of early detection programs for oral cancers in Taiwan and Malaysia respectively. The third presentation was "Methods in Assessing Screening: A Review of a RCT on Oral Cancer/Potentially Malignant Disorder" by Dr. Yang Yi-Hsin, Kaohsiung Medical University, Taiwan, concluded the session with a plenary focused on assessing screening programs through a randomized control trial highlighting the role of detection rates, stage shift, and mortality reduction in effective screening programs.

The breakout session provided an opportunity for participants to discuss ways in which they could develop a research and policy response agenda for BQ/AN interventions. The main priority areas discussed during this session were recommendations for three distinct groups: LMICs, Taiwan and Malaysia. The diversity of the participants in the session from Laos, Nepal, Bhutan, Cambodia, Solomon Islands, Indonesia, India, Micronesia, Malaysia and Taiwan enabled productive discussion on the status of programs in the various countries. The session articulated the importance of a resource appropriate approach in adopting and enhancing the quality of research on screening and early diagnosis programs.

**Methodology**

The breakout session for the Screening and Early Diagnosis of Oral Cancers consisted of expert remarks on research on oral cancer screening and early detection, a session on adjunctive tools for early diagnosis, and a facilitated discussion to identify key priority research areas raised by the participants. The session had five breakout groups, with a facilitator assigned to each. One breakout group focused on Taiwan, a second on Malaysia, and the remaining three groups were comprised of participants from other LMICs. Each group had the opportunity to deliberate on the topics below to come up with a short research protocol.

Facilitators:
1. Dr. Shu-Ti Chiou, Former Director General of Health, Taiwan Health Promotion and Administration, Taiwan
2. Dr. Jennifer Doss, Head of Oral Cancer Research Coordinating Center, University of Malaya, Malaysia
3. Professor Ravi Mehrotra, Director, National Institute of Cancer Prevention and Research, India
4. Professor Rosnah Binti Mohd Zain, University of Malaya Oral Cancer Research and Coordinating Centre (OCRCC), Malaysia
5. Dr. Kurt Straif, Section Head, Section of IARC Monographs, International Agency for Research on Cancer (IARC), France
6. Professor Dr. Yang Yi-Hsin, Kaohsiung Medical University, Taiwan

The Facilitated Discussion was based on the following Key Questions:
- What is the current status of screening programs [Conventional Oral Examination (COE) or others] in your country for the setting for oral cancers?
- How do we gain better evidence on the effectiveness of your program and how might research guide the evaluation of your screening program in your setting?
- What are the challenges in doing research in this area?

**Results**
- The recommendations for developing the proposed research areas were tiered according to each country setting. LMIC country participants were asked to work together to develop research proposals because they face similar challenges in screening and early diagnosis of oral cancers. Currently, these countries do not have national screening programs, and only have the capacity for ad-hoc/opportunistic screening and early detection. The research projects proposed for these groups are presented below.

- LMIC country groups proposed the following research studies:
  1. A study on comparative effectiveness of trained workforce - *primary investigator: Professor Rosnah Binti Mohd Zain, University of Malaya Oral Cancer Research and Coordinating Centre (OCRCC);*
  2. A service oriented study with random allocation of individuals (RCT) or clinics (cluster RCT), so that such services with their data collected can generate high level evidences- *primary investigator: Professor Dr. Yang Yi-Hsin, Kaohsiung Medical University;*

3. A long term study on regular recall to do follow-up screening on these persons and track their clinical outcomes- *primary investigator: Professor Ravi Mehrotra, Director, National Institute of Cancer Prevention and Research;*

4. A collaborative multi-national and multi-center cluster RCT study on oral cancer screening to lead and coordinate the above-mentioned efforts. *primary investigator: Dr. Kurt Straif, Section Head, Section of IARC Monographs, International Agency for Research on Cancer (IARC).*

- Taiwan, Sri Lanka, and Malaysia have more advanced screening and early diagnosis programs than other low-to-middle income countries in the South East and East Asian region, but still need to further evaluate their programs for effectiveness. Researchers in Taiwan, Sri Lanka, and Malaysia can learn from the randomized screening trial on oral cancer that has been conducted and published in Thiruvananthapuram (Trivandrum), India, as is it the first published evaluation of an oral cancer screening program. The formal evaluations of the screening programs for this group will be important in expanding the evidence base in screening and early diagnosis for BQ/AN. The research projects proposed for these countries are presented below.

- The Taiwan group proposed the following research study: A study on the evaluation of the performances and effectiveness of national screening program - *primary investigator: Professor Dr. Yang Yi-Hsin, Kaohsiung Medical University, Taiwan.* In their study, they hope to assess the factors that affect healthcare providers' ability to effectively conduct the national screening program, and the additional research outcomes that can be measured when a screening program is in place. With a national screening program, researchers may have the ability to compare the trajectory of chewing and smoking behaviors between individuals who were screened and those who were not.

- The Malaysia group proposed to the following research study: A study to evaluate effectiveness of its program. This includes improving attendance to screening, detection rates requiring referral and attendance rates (compliance)- *primary investigator: from referrals- Dr. Jennifer Doss, Head of Oral Cancer Research Coordinating Center, University of Malaya.*

**Priority Research Areas**
The final areas of research areas developed from the Screening and Early Diagnosis group were for the three distinct populations of discussion during the breakout session.

1. For LMICs, the opportunities include: performing comparative effectiveness of trained workforce, and setting up multi cluster randomized control trials in these settings;
2. For Taiwan, there is a need for evaluation on the performances and effectiveness of national screening program;
3. For Malaysia, there is a need for program evaluation to look into most efficient approach in prevention and early detection program.

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# Policy Interventions and Economics of Betel Quid and Areca Nut

**Team**

**Session Chairs:**

Dr. Annette David, Senior Partner for health consulting services, Health Partners, LLC, Guam, United States

Dr. Chi Pang Wen, Professor, National Health Research Institutes, Taiwan

**NCI Contact:** Dr. Paul Pearlman, Center for Global Health, National Cancer Institute

**Summary**

The Policy Interventions and Economics of Betel-Leaf and Areca Nut session, led by Dr. Annette David and Dr. Chi Pang Wen, provided an insight into current BQ and AN policy responses in the region. The plenary began with a screening of an educational film produced by the Papua New Guinea Cancer Foundation in cooperation with the US Embassy in Port Moresby. This film highlighted the dangers of AN use in Papua New Guinea and was created as a public health intervention in the country.

The plenary session presentation for this session were "Policy Response to Address Areca Nut for Success of Tobacco Control: Experience from India" by Dr. Monika Arora, Public Health Foundation India, and "Advocacy for Policy Development for Betel Nut and Tobacco Control in the Western Pacific Region" by Mr. James Rarick, WHO Cambodia. Dr. Arora's presentation set the stage by sharing India's experiences in smokeless tobacco, particularly gutka, control through targeted legislation and their evolving response as the market adapted to the ban on gutka. Mr. Rarick then described his regional advocacy work for policy development for betel nut and tobacco control in the WHO WPRO region, using the WHO technical report as a platform for action. The breakout session provided an opportunity for participants to discuss ways to develop a research and policy response agenda for BQ/AN interventions. This helped identify three main priority research areas and five thematic areas for further development.

**Methodology**

Participants attending the Policy break-out session brainstormed in small groups to identify a list of potential research areas and issues for BQ/AN policy interventions. The resulting ideas were clustered according to thematic areas using the broad categories of policy actions in the NCI Center for Global Health's fact sheet "Policy interventions and economics of betel leaf and AN use." Participants voted for the top 3 priorities, and the highest scoring research issue under each thematic area was identified.

**Results**

The Policy group identified the following policy research areas and specific research ideas as priorities for the immediate future:

| Thematic area | Policy research issue |
|---|---|
| Trade | Carry out an assessment of the impact of tax parity across tobacco and AN products. |
| Bans on use, manufacture, sales and agriculture | Evaluate the efficacy of existing BQ/AN bans and implementation challenges to identify strategies for strengthening future legislation and improving enforcement of this legislation. |
| Health service provision | Perform a systematic review of cessation literature and more research on cessation approaches to identify a set of clinical practice guidelines for BQ and AN cessation. |
| Public awareness and outreach | Conduct translational research to convert hard data into effective advocacy messages. |
| Crop Substitution | Undertake exploratory research to identify viable alternatives for AN crop substitution. |
| Other | Commence pilot studies to examine the feasibility of tapping into traditional medicine systems and traditional healers to promote BQ and AN control. |

**Priority Research Areas**

The priority research areas developed at the Policy Interventions and Economics of Betel Quid and Areca Nut session for policy interventions to prevent, control and reduce the use of BQ and AN include:

1. Perform a scan of existing policy research projects, including methodologies and findings and collate these into a policy research monograph.
2. Begin multisectorial in-country consultations to mobilize support for AN/BQ policy interventions and policy research.
3. Convene a bi-regional AN/BQ policy consultation to outline a policy action agenda and to establish a bi-regional alliance or network for policy advocacy and research.

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## Conclusion

Research recommendations for each area of focus were prepared via action planning sessions, and presented to conference participants. Recommendations for future research directions include: evaluation of research, prevention, screening, and policy programs; increased understanding and improvement of the efficacy of early detection and cessation programs related to AN use; and additional research studies to understand carcinogenesis, social norms and cultural beliefs related to use, and how evidence can best inform translation to policy actions necessary to reduce the disease burden. Moreover, the importance of establishing multi-center country and regional research approaches was enforced.

Immediate action is needed to address this neglected global epidemic. A balanced and comprehensive mix of supply and demand reduction strategies, patterned after MPOWER, and investments in surveillance, clinical services and research to better understand addiction, carcinogenesis, social norms and cultural beliefs related to use, and policy impact are essential to address the growing burden of oral cancers in the Asia- Pacific region.