Background: Before the widespread deployment of a new dengue vaccine, we need to consider how best to use limited supplies of vaccine, given the complex dengue transmission dynamics and the immunological interaction among the four dengue serotypes.

Methods: We developed an individual-level simulation model for dengue transmission in Ratchaburi Province in central Thailand, the site of the first double-blinded, dengue vaccine randomized control efficacy trial. The model includes human mobility, a seasonal vector population, and the co-circulation of four dengue serotypes in a population that matches the age and household structure of Ratchaburi. We used the model to investigate the best use of vaccine to reduce the number of cases and dengue-related hospitalizations.

Results: Simulation results indicate that vaccinating children reduces both the number of dengue cases and hospitalizations more than vaccinating the same number of adults, but local dengue transmission can only be stopped if approximately 50-70% of children and adults are vaccinated. We also simulated multi-year catch-up campaigns to estimate their effectiveness.

Conclusion: Our model provides a coherent framework that integrates the natural history and epidemiology of dengue in semi-rural Thailand. The model can be used to plan mass vaccination campaigns, and it will be extended to evaluate coordinated mass vaccination and vector control.

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Type: Poster Presentation

Vaccination against viral hepatitis A and B in adults aged over 40 Years – antibody persistence and immune memory

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Background: Primary vaccination with combined vaccine against viral hepatitis A (VHA) and viral hepatitis B (VHB) induces higher anti-hepatitis B surface (anti-HBs) antibody responses and similar anti-hepatitis A virus (anti-HAV) antibody responses in adults aged over 40 years in comparison with concomitant monovalent vaccines against VHA and VHB. The objectives were to assess, in a clinical study, persistence of anti-HAV and anti-HBs antibodies in adults aged over 40 years four years after primary VHA/VHB vaccination and antibody response following a booster dose of the vaccine.

Methods: Five hundred and ninety-six subjects aged >40 years were vaccinated with three doses of the combined VHA/VHB vaccine at Months 0, 1, 6 (HAB group) or with concomitant VHA and VHB vaccines at Months 0.6 and 0, 1, 6 (ENG + HAV and HBVX + VAQ, respectively). Blood samples were collected one month following primary vaccination (Month 7) and then at one-year intervals for four years after the booster dose with the same vaccine as used for the primary vaccination. The anti-HBs and anti-HAV antibody levels were determined prior to the booster dose and at days 14 and 30 after the booster dose.

Results: At Month 7, >97% of study subjects were seropositive for anti-HAV antibodies in all groups analyzed. Four years after primary vaccination, anti-HAV antibody seropositivity persisted in >93% of study subjects, increasing to >99% after the booster dose. At Month 7, the highest proportion of study subjects with anti-HBs antibody levels > 10 mIU/ml was found in the HAB group (91.7% versus 79.7% in the ENG + HAV group versus 71.0% in the HBVX + VAQ group). Four years after vaccination, anti-HBs antibody levels of 10 mIU/ml persisted in 57.1% of the HAB study subjects in comparison with 40.1% and 26.6% of the study subjects in the ENG + HAV and HBVX + VAQ groups, respectively.

Conclusion: In the adults aged over 40 years, an adequate anti-HAV antibody response persisted for at least four years after vaccination and was higher and more sustained in those who received the combined HAB vaccine.

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Type: Poster Presentation

Clinical impact and economic evaluation of organized HPV vaccination program in Hong Kong

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Background: To model the impact of prophylactic HPV vaccines against persistent HPV 16/18 infections on the age-specific incidence of cervical cancer and to assess the associated incremental cost-effectiveness of HPV vaccination compared to cytology screening only.

Methods: We developed a mathematical model to assess the impact of adding a mass HPV vaccination program under the current cervical screening program. Our model comprised deterministic population-level dynamic and stochastic individual-level components for the development of cervical cancer over the lifetime of individuals. We performed cost-effectiveness analysis (CEA) of organized HPV vaccination for age 12 girls at 45% coverage with lifelong protection and 95% efficacy against HPV types 16/18 persistent infections in a 50-year time horizon. Sensitivity analyses on vaccine effectiveness, vaccination coverage and inclusion of catch-up programs were also performed.

Results: When 12-year girls were annually vaccinated at 45% coverage, the age-specific cancer incidence started to drop substantially (40%-60%) after organized vaccination had begun.
for 40–80 years. Compared with screening only, adding vaccination of 12-year girls without catch-up program resulted in incremental cost-effectiveness ratios (ICERs) ranging from US$11732–14202/quality-adjusted life-year (QALY) for varying the vaccination coverage from 25–80%. The ICER was below US$30000/QALY with the inclusion of a 5-year catch-up program for ages 13–18 girls if the vaccination coverage among 12-year was lower than 70–80%. These conclusions on cost-effectiveness remain valid unless the vaccines provided only 10 years of protection. Sensitivity analyses show that duration of vaccine protection, presence of cross-protection against non-targeted HPV types and cost of vaccines generated greater variation on the cost-effectiveness of the organized vaccine program.

**Conclusion:** Our model suggests that it would take decades for the impact of organized HPV vaccination on age-specific cervical cancer incidence to become apparent. The CEA suggests that HPV vaccination of 12-year girls will likely be a cost-effective addition to current cervical cancer prevention guidelines in Hong Kong, if the vaccine provides at least 15–20 years of protection. However, cost-effectiveness is only one of the important factors to be considered when evaluating the pros and cons of a large-scale organized HPV vaccination program. Public’s acceptability and preparedness of health professionals are also important factors to be considered.

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**Room:** Poster & Exhibition Area

### The effect of oral immunization of kwashiorkor rat model with 38-kDa Mycobacterium tuberculosis protein to induce the secretion of intestinal and bronchial secretory immunoglobulin A (sIgA)

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**Background:** The incidence of tuberculosis (TB) is high on malnutrition people. The new effective TB vaccines will be an essential strategy to eliminate tuberculosis. The 38-kDa Mycobacterium tuberculosis protein is one of the most potent immunogen. The previous research showed that oral vaccination with 38-kDa Mycobacterium tuberculosis protein increased secretion of sIgA in normal rat intestinal and bronchial, however it has not been proven yet in the rat model of kwashiorkor. This study aimed to determine whether oral immunization with 38-kDa Mycobacterium tuberculosis protein could induce the sIgA secretion in intestinal and bronchial mucosa of kwashiorkor rat model.

**Methods:** Rattus norvegicus rats were divided into 4 groups, there were control group (normal rats), kwashiorkor rat models with low-protein diet 0%, 2% and 4%. All groups were given 38-kDa Mycobacterium tuberculosis protein with adjuvant orally, following with 2 booster every week. After 1 week of the second booster, rats were killed and intestinal and bronchial mucosa were taken for sIgA secretion and measured by sandwich ELISA.

**Results:** Mean (SD) intestinal sIgA are 261.01 (8.64); 233.38 (11.78); 245.60 (7.02) and 246.31 (10.86) ng/mL for the normal group, low-protein diet 0%, 2% and 4% respectively. Mean (SD) bronchial sIgA are 78.13 (28.8), 19.06 (3.6); 24.96 (8.15) and 29.44 (5.9) ng/mL for the normal group, low-protein diet 0%, 2% and 4% respectively. Statistical test showed there is no significant difference of intestinal sIgA level among normal group and low protein diet groups (p > 0.05). Otherwise, in bronchial, there is a significant difference among normal and low protein diet groups (p < 0.05), which bronchial sIgA in groups of low-protein diet are lower than normal group.

**Conclusion:** Immunization with 38-kDa Mycobacterium tuberculosis protein orally can induce sIgA secretion from intestinal kwashiorkor rat model as much as normal rat, but not in the bronchial. It reveals that 38-kDa M. tuberculosis protein can act as immunogenic factor in inducing intestinal humoral immunity of kwashiorkor rat model.

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### A prospective study comparing occurrence of post-vaccination fever among Thai children given either DTwP or DTaP-based vaccines

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**Background:** Post-vaccination fever is common in children given routine immunization. There have been limited studies comparing onset of fever and occurrence of other adverse events in Asian children following vaccination with whole-cell and acellular pertussis-based vaccines.

**Methods:** A total of 150 healthy children aged 2 months to 49 months were enrolled in the study of which 75 received DTwP-based (wP) vaccines and another 75 received DTaP-based (aP) vaccines. The primary objective was to compare occurrence of fever (T ≥ 37.8°C) between the 2 groups of children. The secondary objective was to compare occurrence of high fever (T ≥ 39°C), fussiness, prolonged crying, medical consultation including analgesic/anti-pyretic given, lost sleep of parents and child, missed days from work for parents and other adverse events between the 2 groups. Parents recorded their observations in a study diary within 72 hours following vaccination. Completed diaries were returned by mail. However, for parents who were unable to do so, data was taken by telephone interview along with review of the study diary.

**Results:** A total of 140 out of 150 study participants were included in the analysis - 72 (wP group) and 68 (aP group). There were 77 males (55%) and 63 females (45%) with a median age of 4 months; IQR 2 - 6. The median weight was 7.1 kg; IQR 5.6 - 8.7. Twenty children developed fever (T ≥ 37.8°C) within 4 hours following vaccination of which 17/72 (23.6%) were from the wP group and 3/68 (4.4%) were from the aP group (p-value = 0.001). More children [30/63 or 47.6%] in wP group developed infant fussiness compared with those in aP group [16/68 or 23.5%](p-value = 0.007). Children who received wP vaccines [40/72 or 55.5%] significantly had higher incidence of swelling on injection site compared with those who received aP vaccines [5/68 or 7.4%](p-value < 0.001).

**Conclusion:** Most of the children who developed fever (T ≥ 37.8°C) within 4 hours following vaccination received wP vaccines.