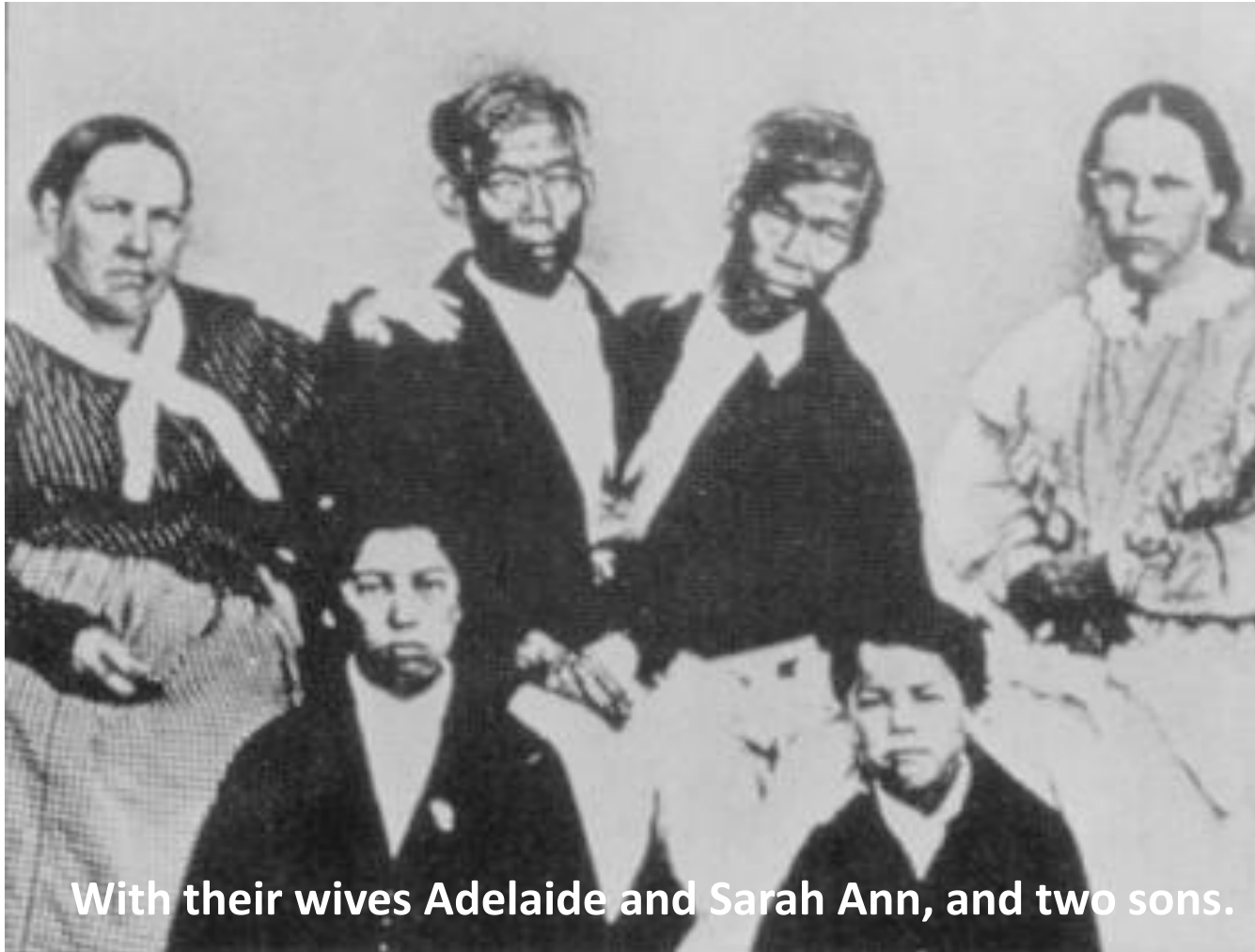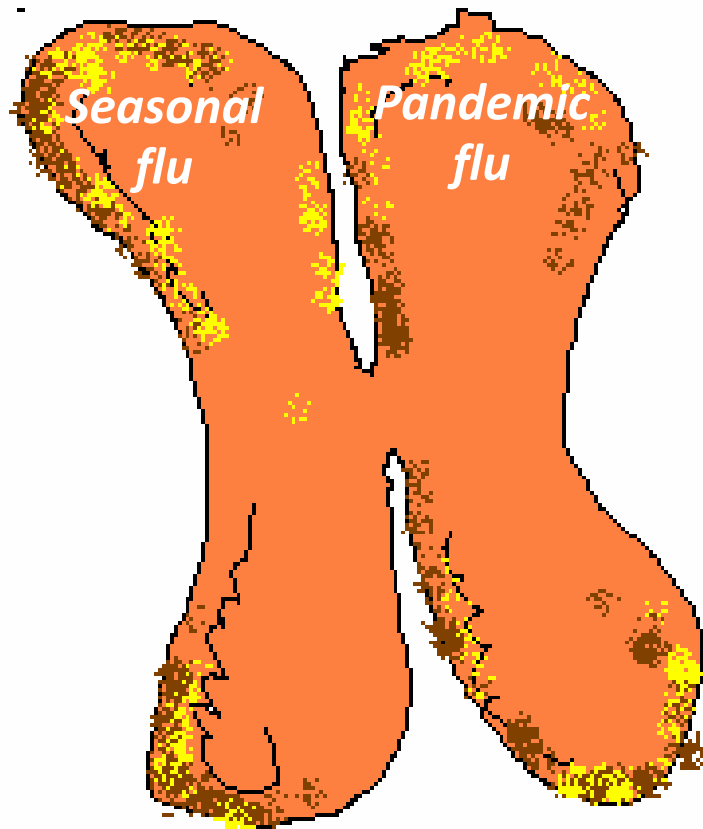# Influenza control

Driving national influenza policy: the Siamese Twins model

With their wives Adelaide and Sarah Ann, and two sons.

Seasonal flu

Pandemic flu

ยุทธศาสตร์
"ปาท่องโก๋"

Cooperation on influenza

Surveillance & laboratory investigation

Case management

Prevention: NPI / risk com / other

Vaccine and immunization

Hospitals

SRRTs
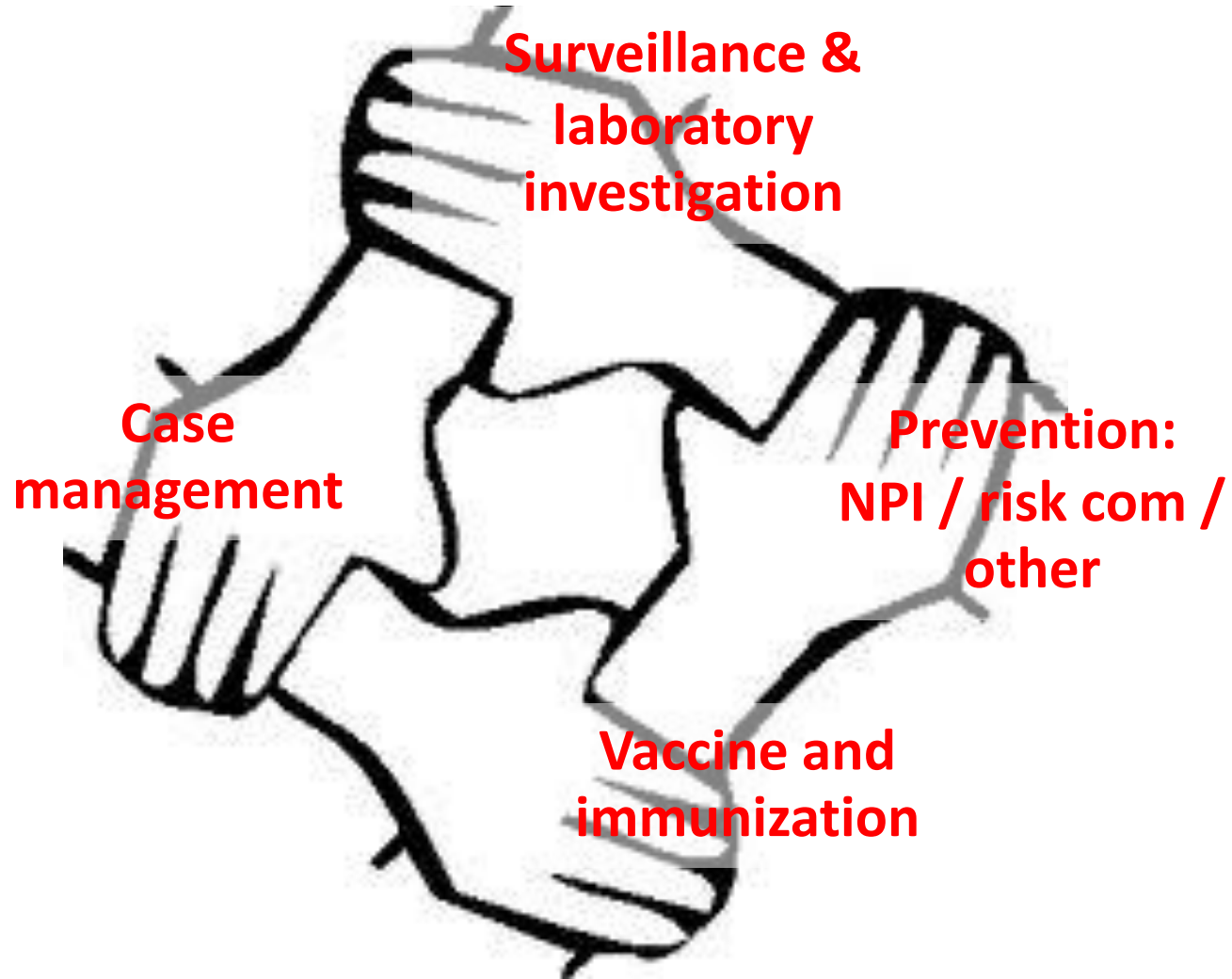
Influenza Surveillance partners

Veterinarians

Laboratory

Pathologist

Evidence need for influenza policy & strategy

Area of work	Key questions	Evidence needed
Case management	• Is it really flu or other V? • Is AV in use a good choice?	Diagnosis AV sensitivity
Immunization policy	• Is vaccination a good investment? • Is flu vaccine a good match for circulating V? • When should flu vaccine be given? • Who should be vaccinated?	• Disease burden, CB / CE • Virus characters • Seasonality • Risk population
Vaccine manufacture & procurement	• What is the right vaccine composition of the year?	Virus characters
Vaccine R&D	What are the best feasible/available vaccine model and composition?	Virologic & immunologic characters of flu virus
Risk communication	• What is current flu situation? • How can people protect & take care of themselves?	Disease situation / epi.
Non-pharmaceutical intervention	Are the recommended NPI effective?	Assessment of NPI tools.

Evidence for policy on flu vaccination

- **Disease burden / epidemiology**
  - Season influenza
  - Pandemic influenza
- **Vaccine quality**
  - safety
  - efficacy
- **Health economics**
  - Cost-effectiveness
  - Cost-benefit
  - Cost saving

Evidence for policy on flu vaccination
<u>Burden of seasonal influenza</u>

Parameter or issue	Methodology	Key findings	investigator / Reference
Influenza & pneumonia burden	Routine surveillance	<u>Reported</u> • Influenza cases: 17,424 / yr • Pneumonia case: 145, 290 / yr • Pneumonia deaths: 874 / yr	Bureau of Epidemiology, 2006 DMSc
Influenza & pneumonia burden	Extrapolation from study of Simmerman, on reported data	<u>Estimated (min)</u> • Flu cases: 749,189 cases / yr • Pneumonia cases: 242,150 / yr • Flu pneumonia cases 26,637 / yr • Flu pneumonia deaths 161/ yr	Charung M, In flu vaccination project proposal to NHSO Board, 2007
Influenza & pneumonia burden	Prospective pop.-based surveillance	• 23% of ILI at OPD is flu positive • 10% of hospitalized pneumonia is caused by influenza • OPD visits from flu: 924,478 / yr • Loss of work days: 3.1 mill. / yr • Loss of school days: 1.7 mill. / yr	Simmerman M, et al, 2006 DMSc

Evidence for policy on flu vaccination
Burden of pandemic influenza

Parameter or issue	Methodology	Key findings	investigator / Reference
Health impact of pandemic	Simple extrapolation	Estimated impacts of an flu pandemic in Thailand: Low estimates: • 6.5 million cases • 6,500 – 35,000 deaths High estimates: • 26 million cases • 26,000 – 143,000 deaths	National strategic plan on AI & PI, 2005-2007
Economic impact of pandemic		0.39% GDP loss from avian influenza outbreaks in 2004 (as benchmark for estimation of human influenza pandemic)	NESDB 2005

Evidence for policy on flu vaccination
Influenza epidemiology

Parameter or issue	Methodology	Key findings	investigator / Reference
Risk group	Prospective pop.-based surveillance	Groups at risk of serious complications • Elderly and young children • Persons with chronic cardiac and respiratory diseases • Persons hospitalized in previous year	Simmerman M, et al, 2006 DMSc
Influenza seasonality	Prospective surveillance	Influenza cases peak during June-October	Simmerman M, et al, 2006
Influenza seasonality	Routine surveillance	Influenza cases are reported all year round, more case during May-October, peaks usually in July	Bureau of Epidemiology, DMSc
Match of circulating & vaccine virus	Laboratory surveillance, over the past decade	Characters of circulating flu viruses in Thailand each year are close to those of recommended vaccine strains for both northern and southern hemispheres	NIH/ Dep.of Med. Sci./ MOPH

Evidence for policy on flu vaccination
Cost & vaccine effectivess

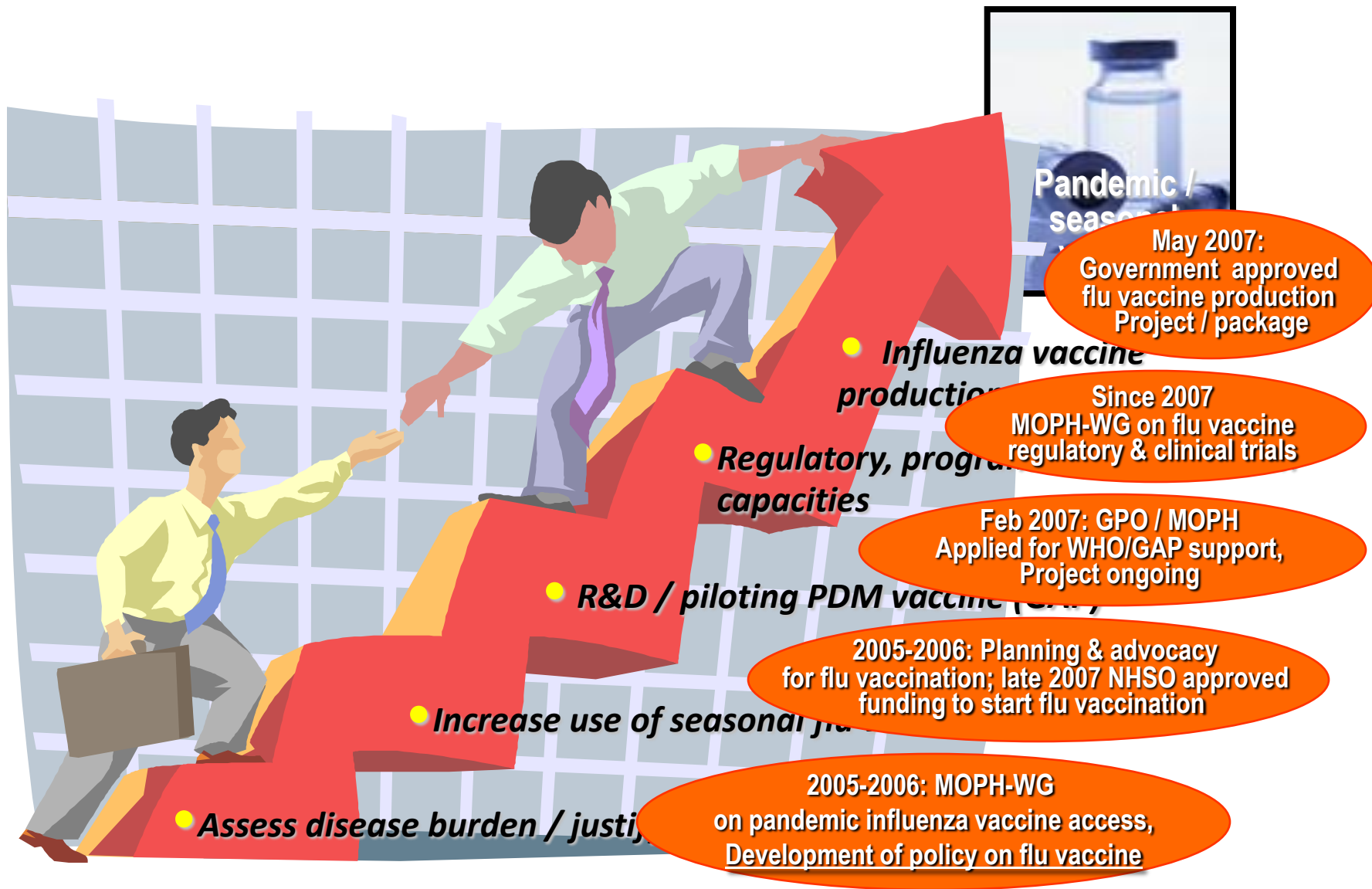| Parameter or issue	Methodology	Key findings	Reference
Medical cost	Prospective study	Unit cost of pneumonia treatment: $ 490.8 in community hospital, $ 628.6 in provincial hospital	Olsen J S, et al. In Int J of ID (2006) 10, 439-445.
Vaccine effectiveness	Epidemiologic Survey	Flu vaccination to the elderly will reduce pneumonia incidence by one half (AR 4.83% in vaccinated group compared with 10.88 in unvaccinated)	1.Rungnirand P. et al. In J Med Assoc Thai Vol.88 No.2 2005
Vaccine effectiveness	Epidemiologic Survey	Flu vaccine effectiveness 76% in persons with COPD	Wongsurakiat P, et al. In J Med Assoc Thai, 2003
Benefit of flu vaccination	Simple estimation	Flu cases prevented: 400,000 / yr Pneumo. deaths prevented: 25,000/ yr Medical cost saved: 736 M baht Indirect cost saved: 800 M baht	Charung M, In flu vaccination project proposal to NHSO Board, 2007

Evidence for policy assessment: Vaccine efficacy / effectiveness

Parameter or issue	Methodology	Key findings	Reference
Seasonal flu vaccine effectiveness	Prospective cohort study in 2 provinces	Significantly reduced hospitalization and deaths in the elderly (> 65 yr) with chronic diseases. (N: 2000).	Lert-thien-damrong J and Siriaraya-porn P, et al. 2008
Seasonal flu vaccine efficacy	Epidemiologic Survey	Seasonal flu vaccination had 42% efficacy against ILI in hospital staff in Buriram province (N:57). Hand washing was protective.	Yodkalw E, et al. (FETP) 2010
Pandemic H1N1 vac efficacy	Epidemiologic Survey	50 % efficacy against ILI, 80% efficacy against H1N1 infections in prisoners (N:100). 50% coverage needed for herd effect.	Praekunatham H, et al. (FETP) 2010
Pandemic H1N1 immu-nogenicity	Prospective cohort, serologic study	62% immunogenicity after single injection in medical staff (N: 252) at Barasnaradura Hospital.	Kankawinpong O, et al. 2010

Evidence for policy assessment: Pandemic burden / epidemiology

Parameter or issue	Methodology	Key findings	Reference
Infection rate	Mathematic modeling	Estimated 13% of Thai people infected in the first wave of pandemic, May-Oct 2009	FETP / BOE 2009
Infection rate	Mathematic modeling	Estimated additional 8-10% of the population infected in the second wave of pandemic, Jan-April 2010	FETP / BOE 2010
Symptomatic infection	Epidemiologic investigation	In an outbreak of pandemic H1N1 in an institution, infection rate was 68%, and 70% of infections was symptomatic	FETP / BOE 2009
Risk factors	Routine surveillance & epidemiologic investigation	Population groups at risk of severe H1N1 infections included: pregnant women, obesity, heart and lung diseases, chronic conditions	FETP / BOE 2009

Drive for secure access to pandemic influenza vaccine

- Influenza vaccine production

- Regulatory, program capacities

- R&D / piloting PDM vaccine (GPO)

- Increase use of seasonal flu

- Assess disease burden / justify

May 2007: Government approved flu vaccine production Project / package

Since 2007 MOPH-WG on flu vaccine regulatory & clinical trials

Feb 2007: GPO / MOPH Applied for WHO/GAP support, Project ongoing

2005-2006: Planning & advocacy for flu vaccination; late 2007 NHSO approved funding to start flu vaccination

2005-2006: MOPH-WG on pandemic influenza vaccine access, Development of policy on flu vaccine

Projection on use of seasonal influenza vaccine in Thailand

Pre-AI period

AI response period

Pandemic preparedness period

Pandemic response

Vaccine production project

Increased use of flu vaccine

Capacity building

Scale up to produce pandemic vaccine

Technology: Cell-culture Adjuvant LAIV

12000000
10000000
8000000
6000000
4000000
2000000
0

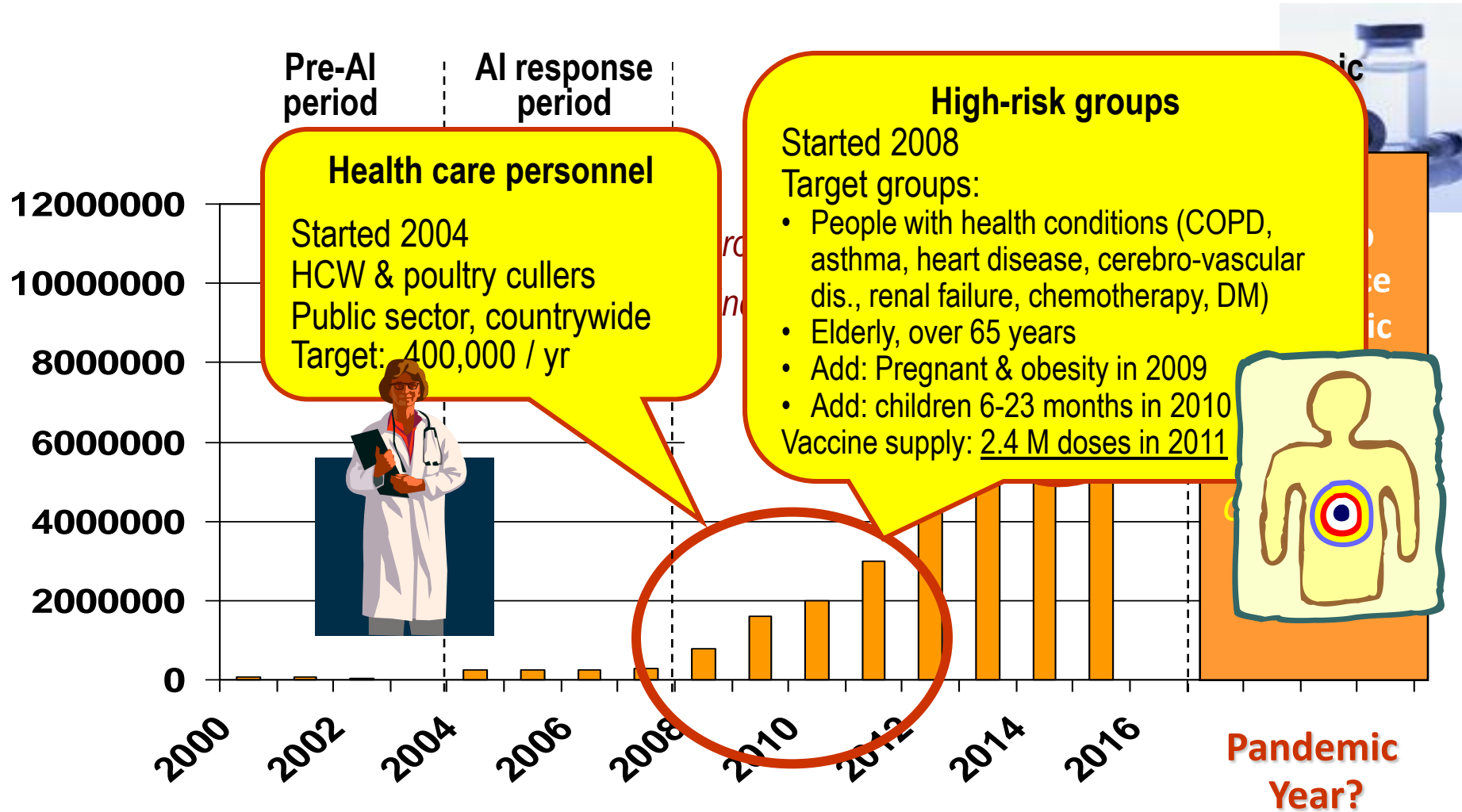2000 2002 2004 2006 2008 2010 2012 2014 2016

Pandemic Year?
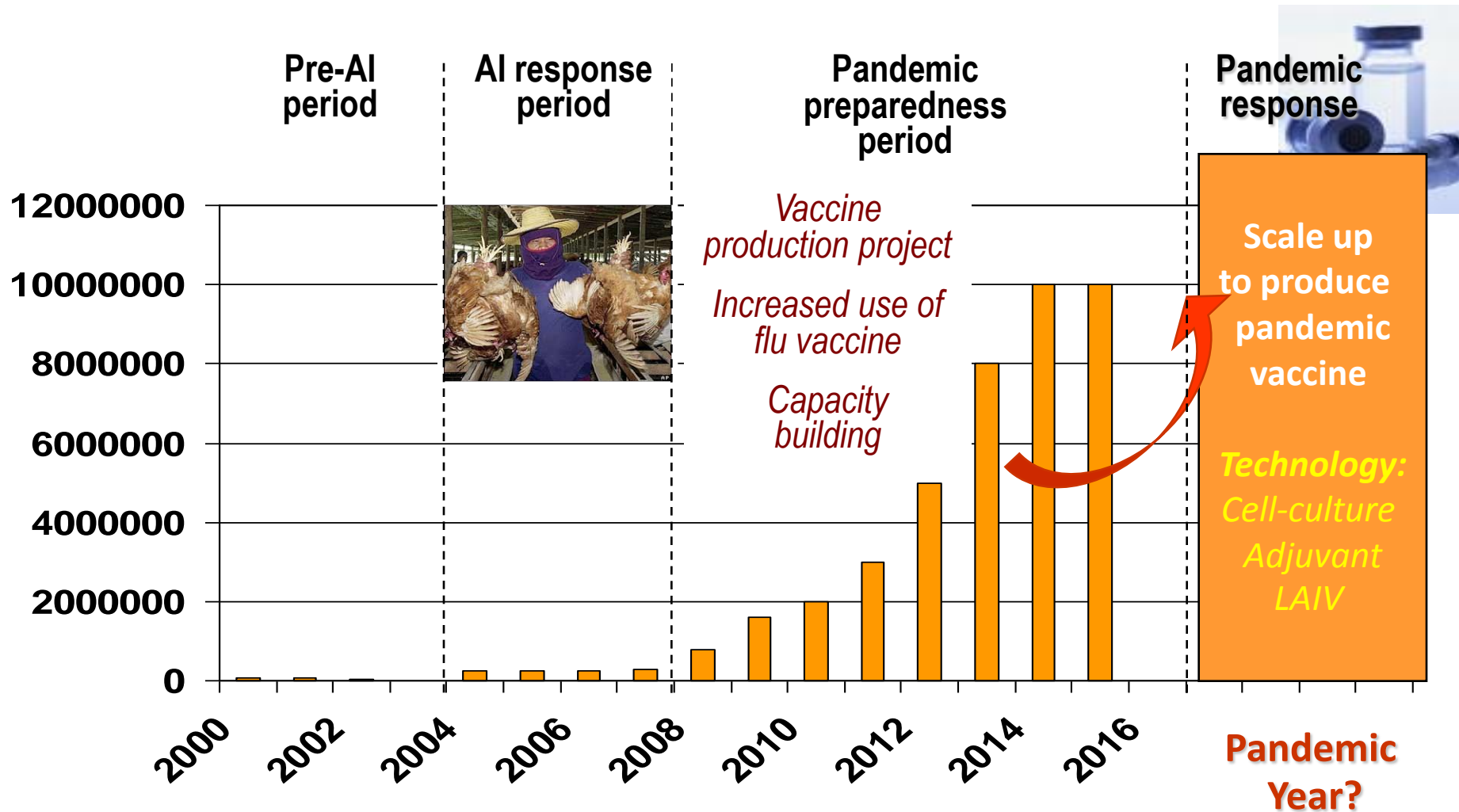
Note: 2000-2003 figures -- from Simmerman et al.

2004 -2005 figures – initial projection

Projection on use of seasonal influenza vaccine in Thailand

Pre-AI period

AI response period

Health care personnel

Started 2004
HCW & poultry cullers
Public sector, countrywide
Target: 400,000 / yr

High-risk groups

Started 2008
Target groups:
- People with health conditions (COPD, asthma, heart disease, cerebro-vascular dis., renal failure, chemotherapy, DM)
- Elderly, over 65 years
- Add: Pregnant & obesity in 2009
- Add: children 6-23 months in 2010
Vaccine supply: 2.4 M doses in 2011

Pandemic Year?

Note: 2000-2003 figures -- from Simmerman et al.

2004 -2005 figures – initial projection

Capacity built (4)

GPO's manufacture plant   for influenza vaccine

- **Currently under construction in Saraburi Province**
- **Capacity 2 – 10 million doses / year**
- **To produce seasonal influenza vaccine annually, and switch to a pandemic vaccine when necessary**

Capacity built (3)

- Stockpiles of antivirals and PPE are sufficient and provide timely supply. The national stockpiles are in connection with regional stockpiles (WHO, ASEAN)
- GPO has established Oseltamivir production capacity.
- Influenza vaccine capacity
  - Pilot production of pandemic influenza vaccine under WHO's GAP,
  - Industrial production of seasonal flu vaccine under preparation by GPO
  - National seasonal flu vaccination since 2008

Cooperation on influenza
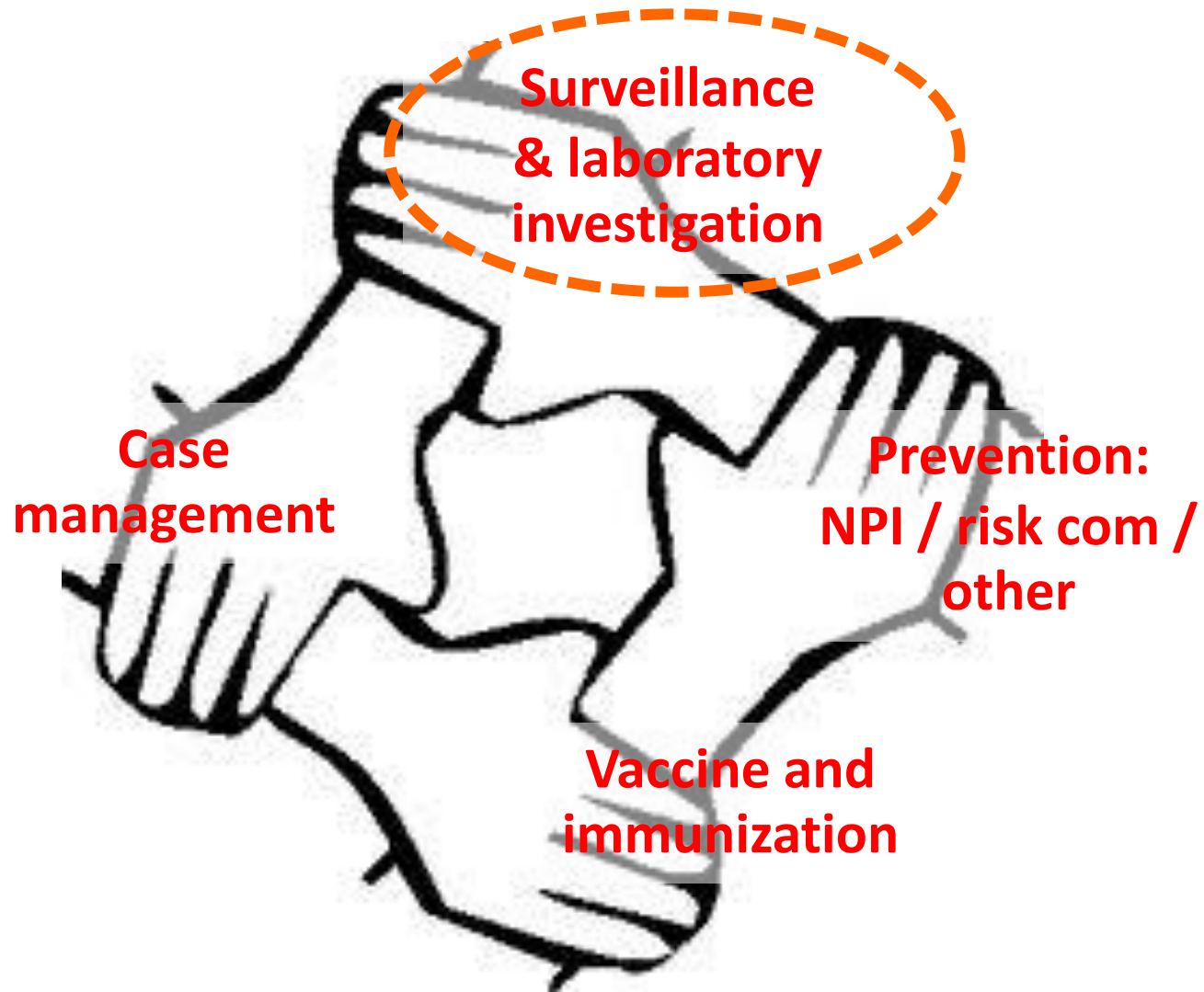
Cooperation on influenza

Case management

**Strength and sustainability
of influenza surveillance and
laboratory**

- Policy & financial support
(need for evidence-based policy
making)
- Cooperation / partnerships:
  - National
  - International
- Research and development
  - epidemiologic
  - laboratory
- Human resource development
- Public communication and education

Thank you