

Burden and cost of echinococcosis in Mongolia

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National Center for Zoonotic Disease of Mongolia

and

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Swiss TPH Winter Symposium 2018

Zoonoses Control in Humans and Animals-

Taking Stock and Future Priorities,

Basel, 06 Dec 2018

Echinococcosis

Cystic Echinococcosis- CE

(*Echinococcus granulosus*)

- Endemic, widespread in Mongolia
- More domestic animals
- High exposure of nomadic farmers
- Control tools available human, dogs, and livestock
- Public health problem in Mongolia

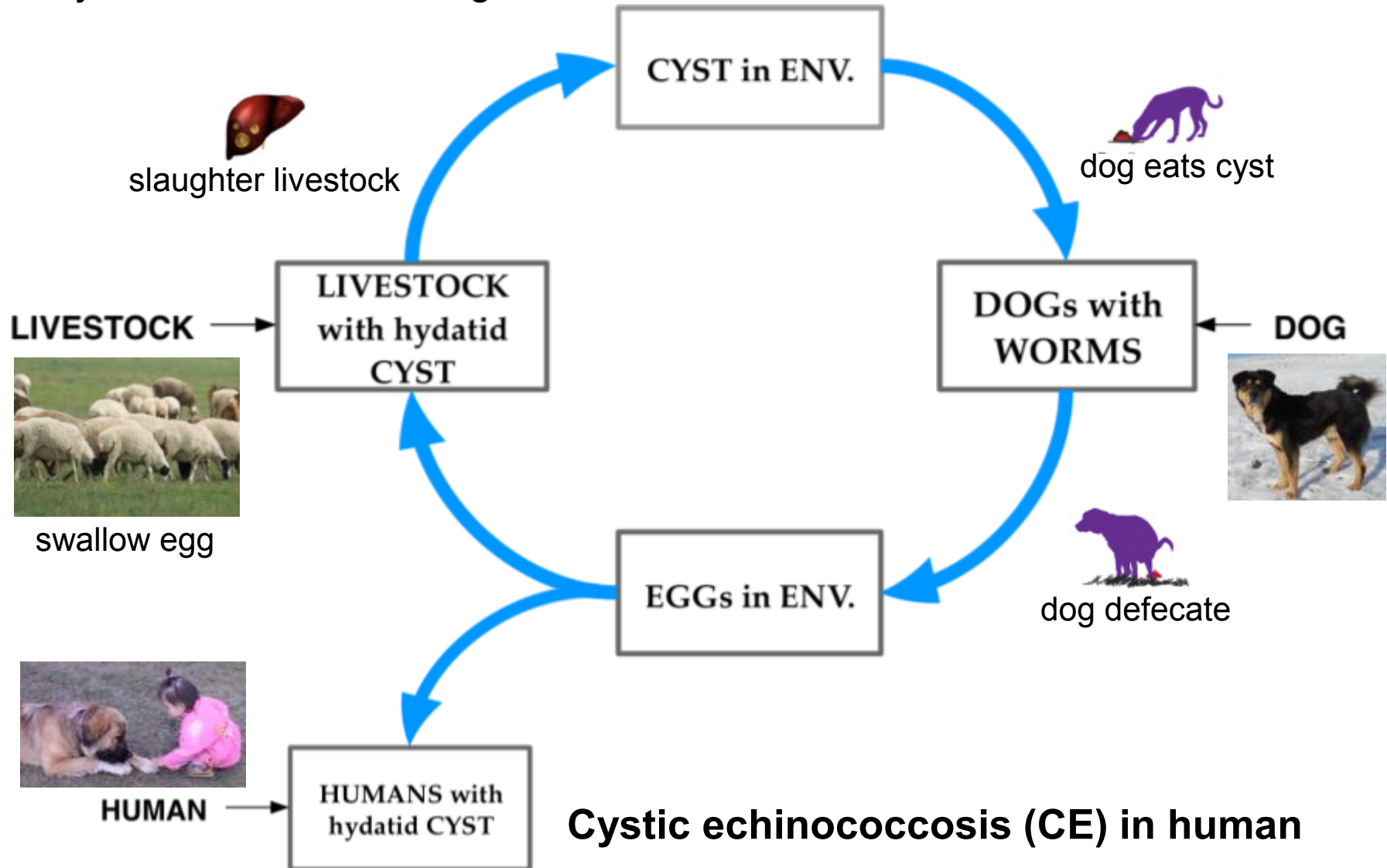
Alveolar Echinococcosis- AE

(*Echinococcus multilocularis*)

- Cases are rare, regional in Mongolia
- More wild animals and rodents
- Less chance of exposure
- Control of AE is complex, expensive

Cystic echinococcosis- CE

Life cycle of *Echinococcus granulosus*



Background of Mongolia



Area: 1,5 million square km
Provinces: 21

- **Human population:** 3 million
- **Livestock population:** 64 million
- **Dog population:** No data

Horse



4 mill.

Cattle



3 mill.

Camel



0.4 mill.

Sheep



30 mill.

Goat



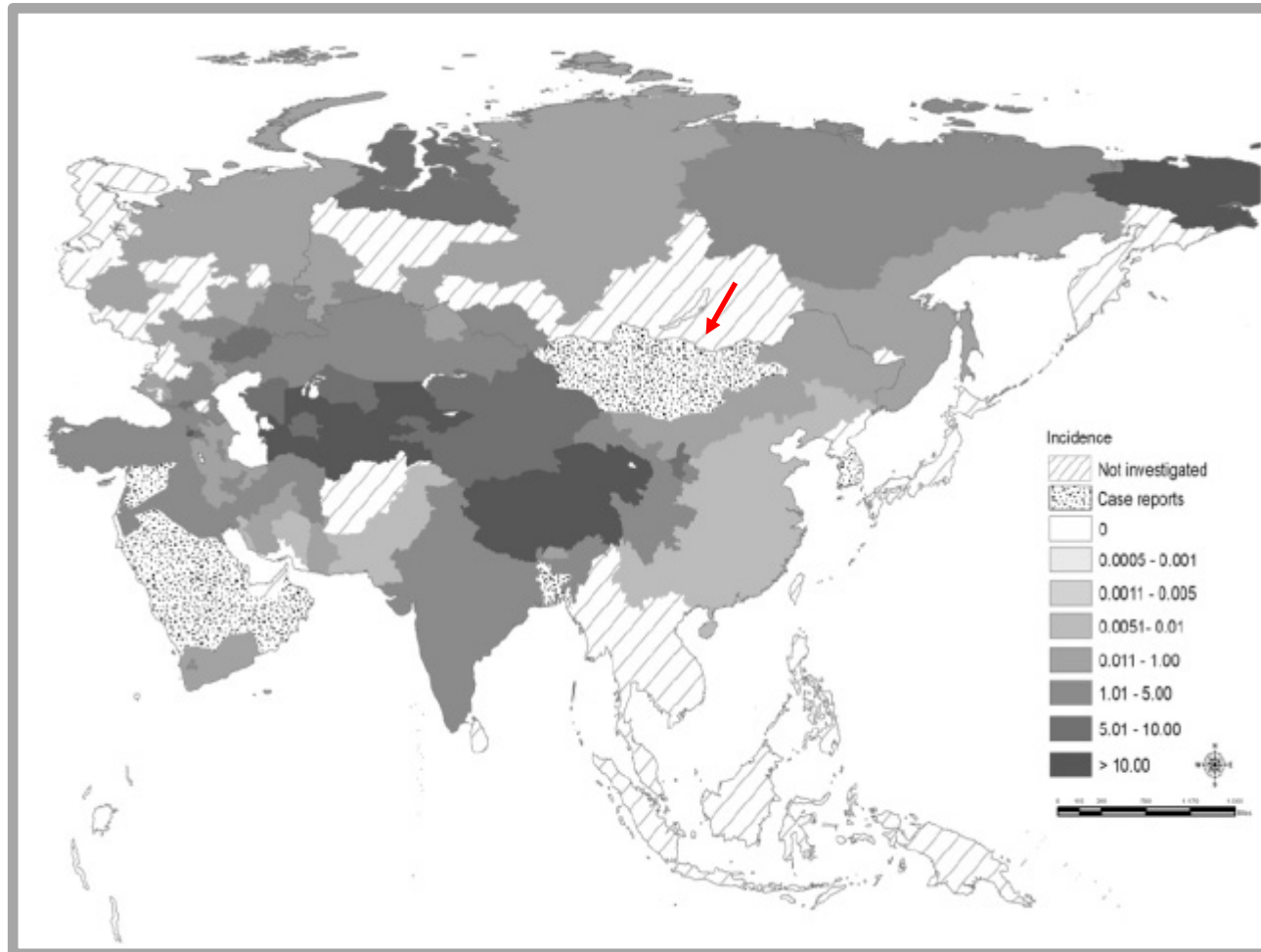
27 mill.

Background of Mongolia: CE risk

- Private and unregulated slaughtering after 1990s
- Lack of control program for CE in last decades
- Stray dogs population increased dramatically
- Behavioral risks:
 - Feeding of an offal (e.g liver) to dogs
 - Poor hand hygiene in rural area



Human Cystic Echinococcosis in Asia, 2017



Deplazes et al., (2017)

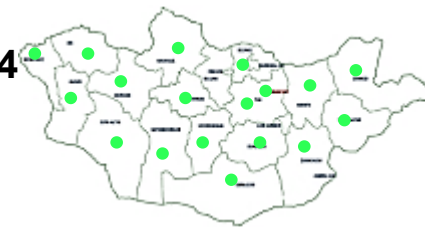
Burden of CE in Mongolia



Tertiary hospital: 3
Surgery



Secondary hospital: 34
Ultrasound



Primary clinics: 540



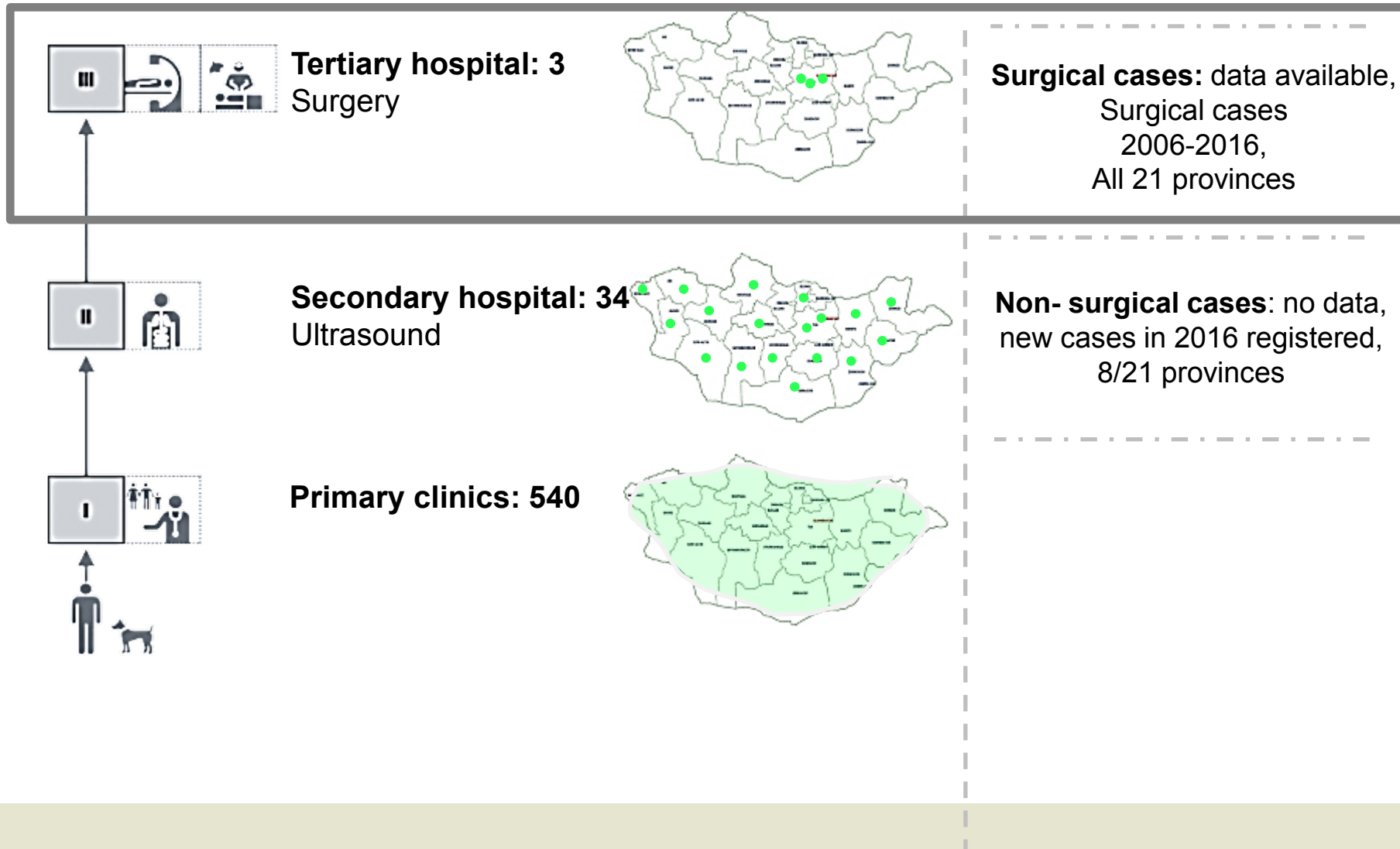
Data collection

Surgical cases: data available,
Surgical cases
2006-2016,
All 21 provinces

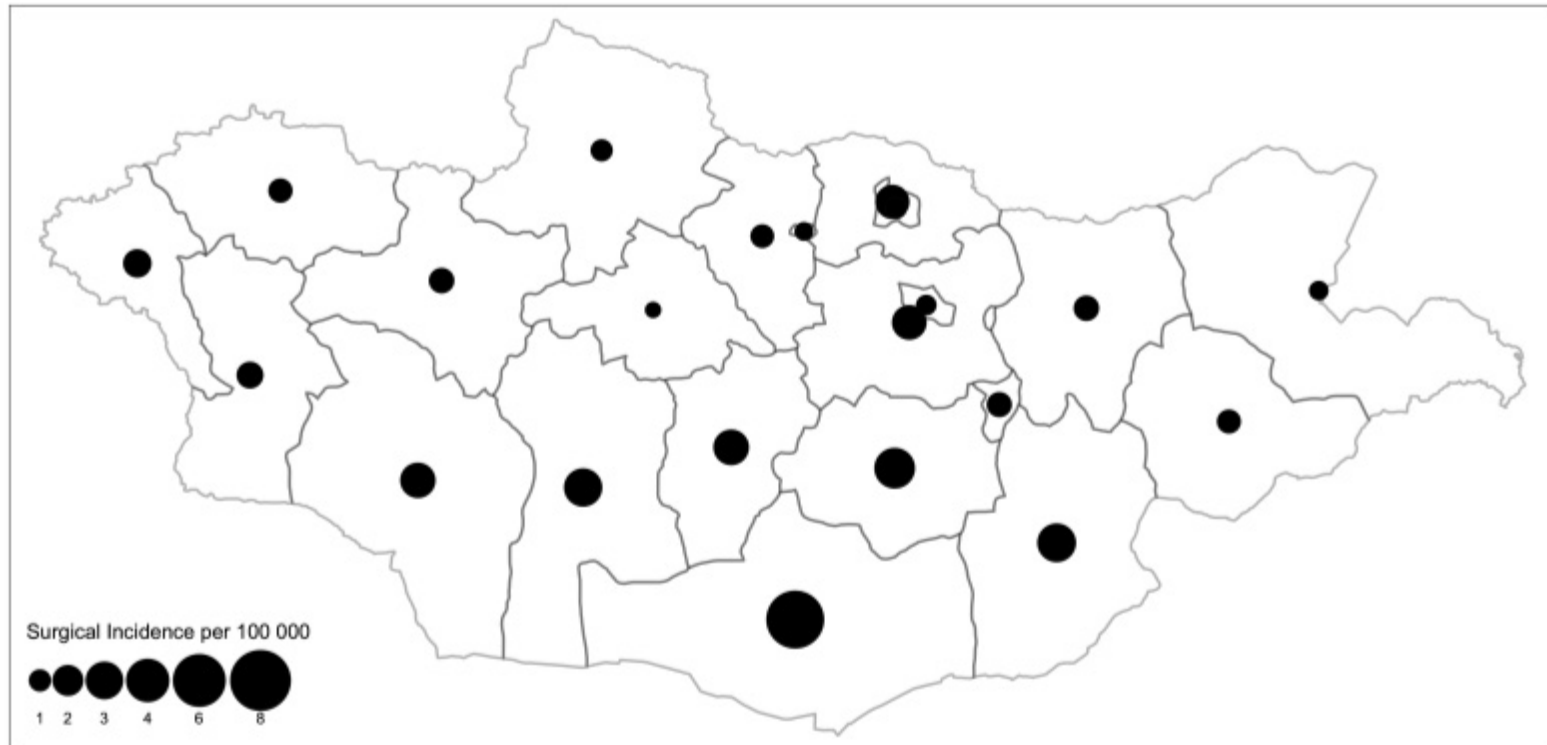
Non- surgical cases: no data,
new cases in 2016 registered,
8/21 provinces

Burden of CE in Mongolia

Data collection



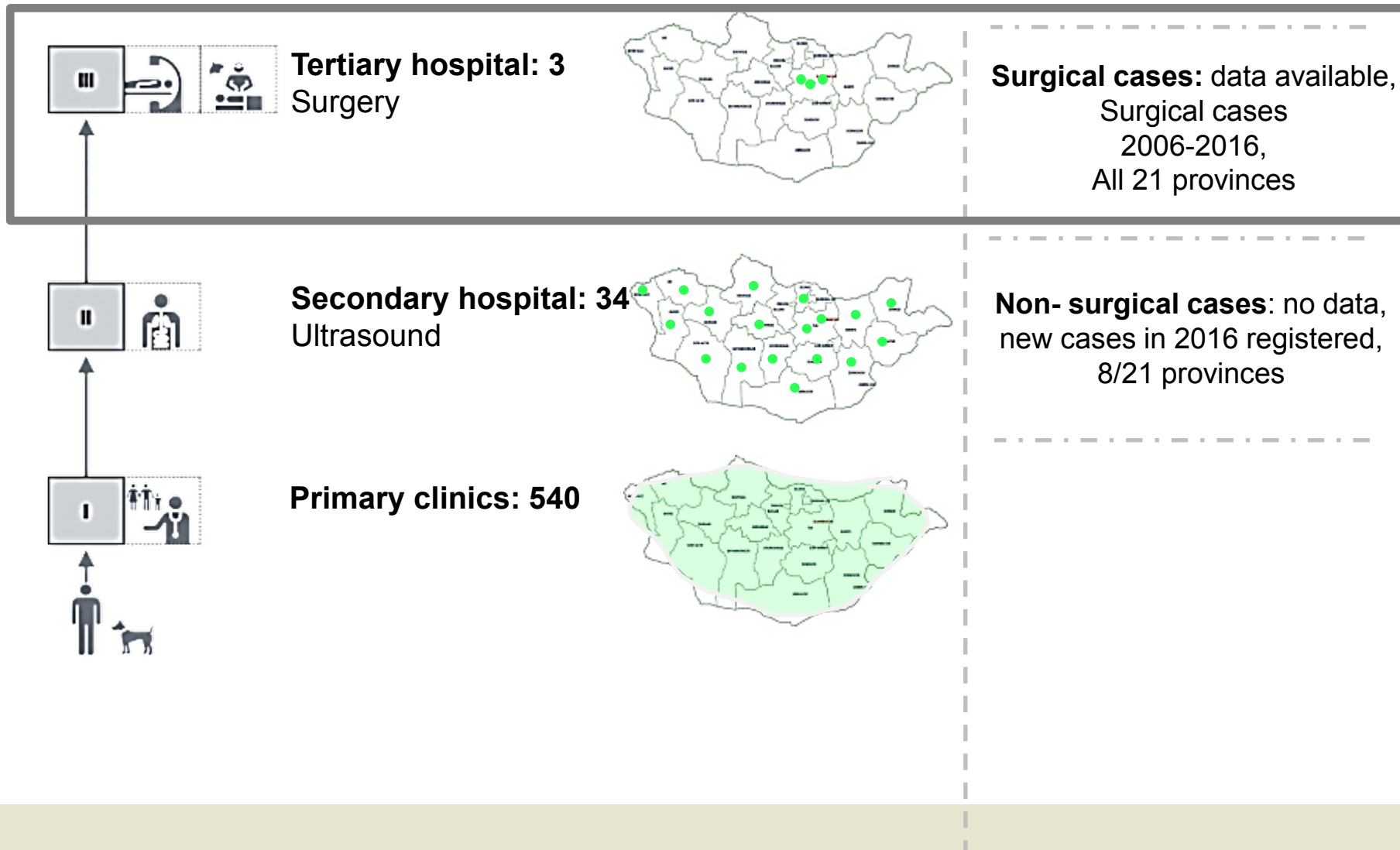
Geographic distribution of surgical cases per 100 000 person years, 2006-2016,



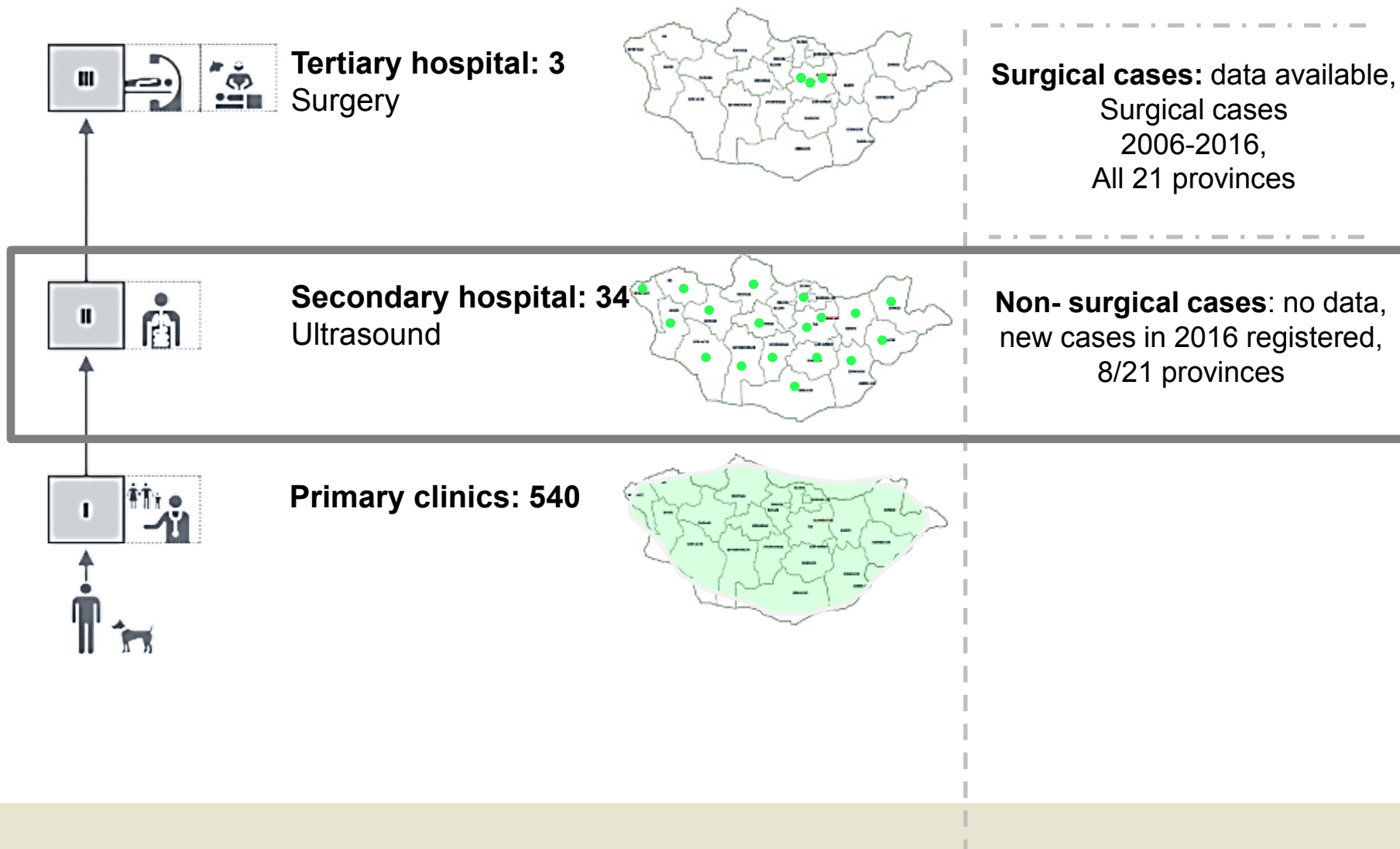
Estimated surgical incidence: **2.2 per 100 000**

Burden of CE in Mongolia

Data collection



Burden of CE in Mongolia



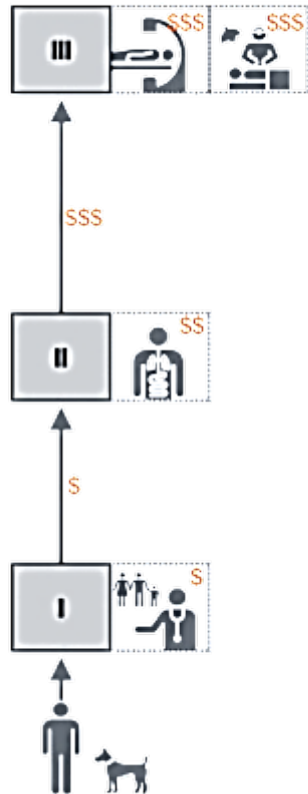
Burden of CE in Mongolia: Result

- Diagnosed cases **15.9 per 100 00**
- Surgical cases **2.2 per 100 000**

Incidence of diagnosed cases are **7 times** higher than incidence of surgical cases

Cost of CE in Mongolia

Interview with surgical patients:



1. Direct medical cost:

- **Public:** basic diagnostics, hospital stay
- **Private** (out-of-pocket): advanced diagnostics, informal fee, albendazole

2. Direct non-medical cost:

- Transportation, accommodation

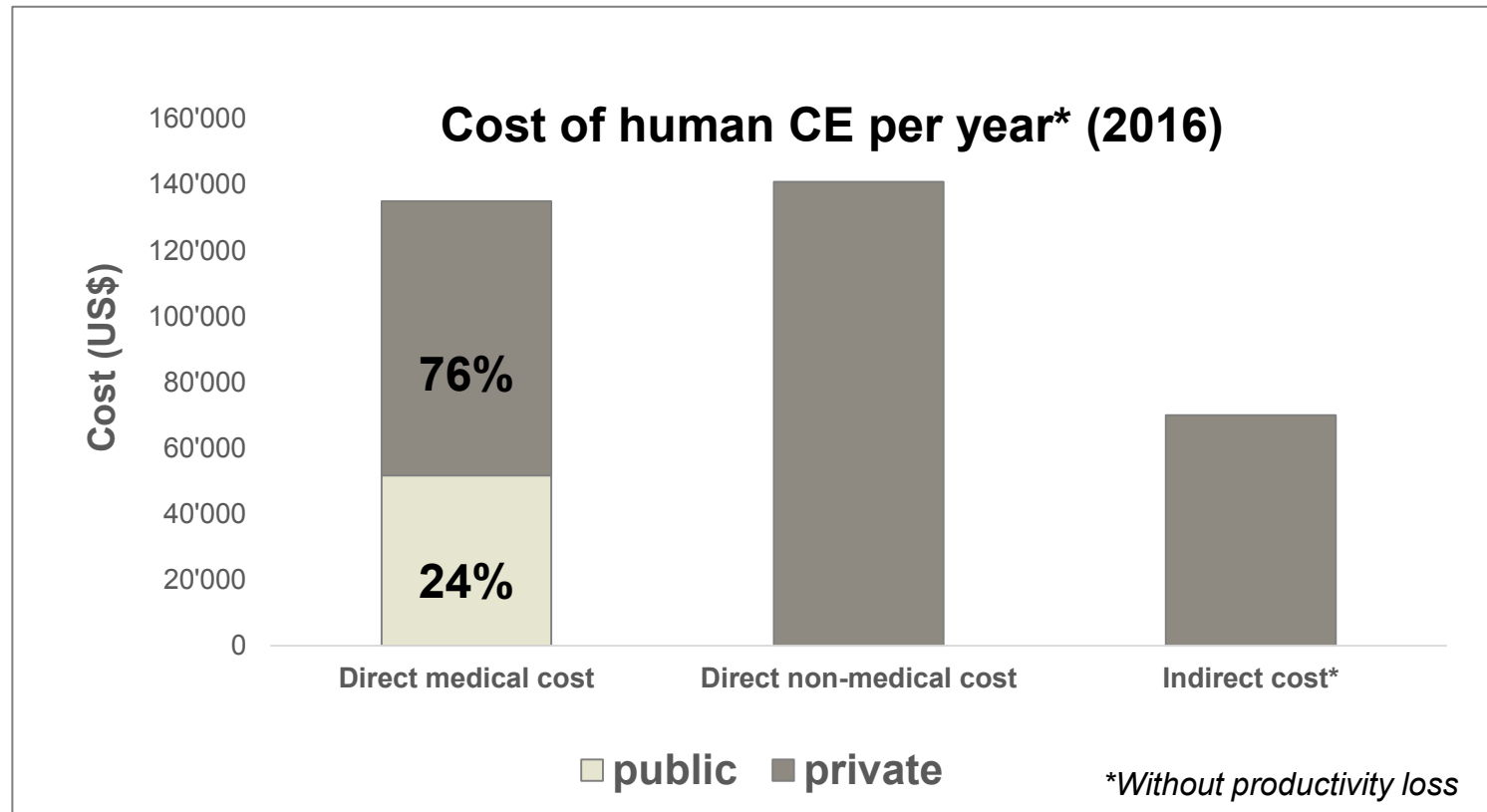
3. Indirect cost:

- Income loss

Human productivity loss was based on *Benner et al., (2010)*

Animal productivity loss was not available due to lack of prevalence data

Cost of CE in Mongolia: Result



- **Cost of albendazole** contributed most in out-of-pocket money
- 1 pill app. 1.5US\$ → everyday 2 during 3 months is expensive

Clinical management of CE in Mongolia

1. Focus group discussion on current CE clinical management:
2. One round Delphi survey on current CE clinical management:
3. Assessing medical records of CE patients received surgery:



The gap in the surveillance system for echinococcosis

- Radiological doctors at provincial hospital detect cases,
- Surveillance system for zoonotic disease exist



BUT why CE not reported


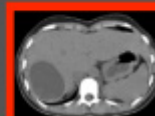



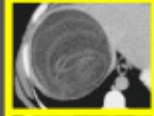
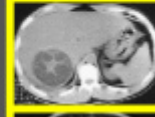
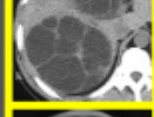
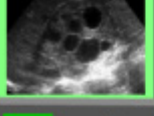
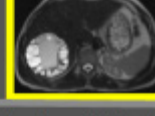
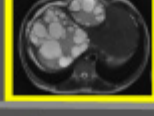






- Do not report cases to notifiable disease reporting system.
- The lack of guideline, SOPs for case detection, triage, refer, report



Clinical management of CE

Recommended algorithm:

WHO-Informal Working Group on Echinococcosis (WHO-IWGE), 2010

Active cysts	Early Rx	Late Rx	Very late Rx	No Rx	Inactive cysts
	Risk of complications				
	≤5-6 cm	>5-6 cm <10 cm	≥10 cm		
CE1					
CE3a					
CE2					
CE3b					
	 Benzimidazoles (possibly higher efficacy)			 Watch & wait	
	 Benzimidazoles (possibly lower efficacy)				
	 PAIR				
	 Surgery / (continuous catheter drainage [CE1, CE3a], large-bore catheter [CE3a, CE3b, CE2])				
					CE4
					CE5

PAIR – Percutaneous aspiration, injection, re-aspiration

Stojkovic et al.,
(2013)

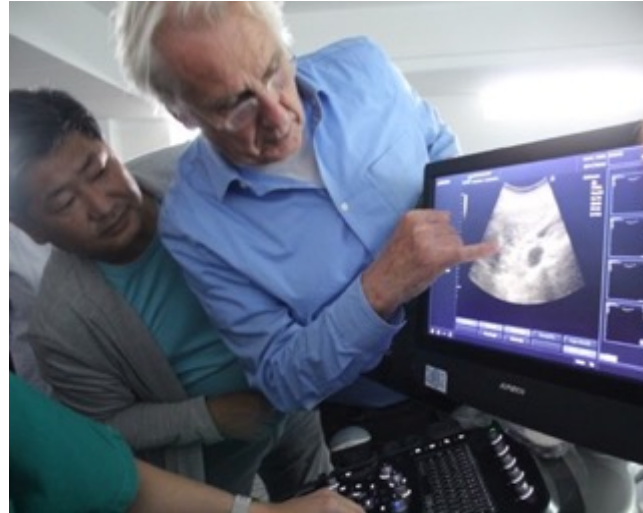
Cyst stage:

CE1, CE2, CE3a, CE3b, CE4, CE5 and CL

Stage specific treatment options:

- Benzimidazole/albendazole
- Percutaneous treatment (PT)
- Surgery
- Watch&Wait

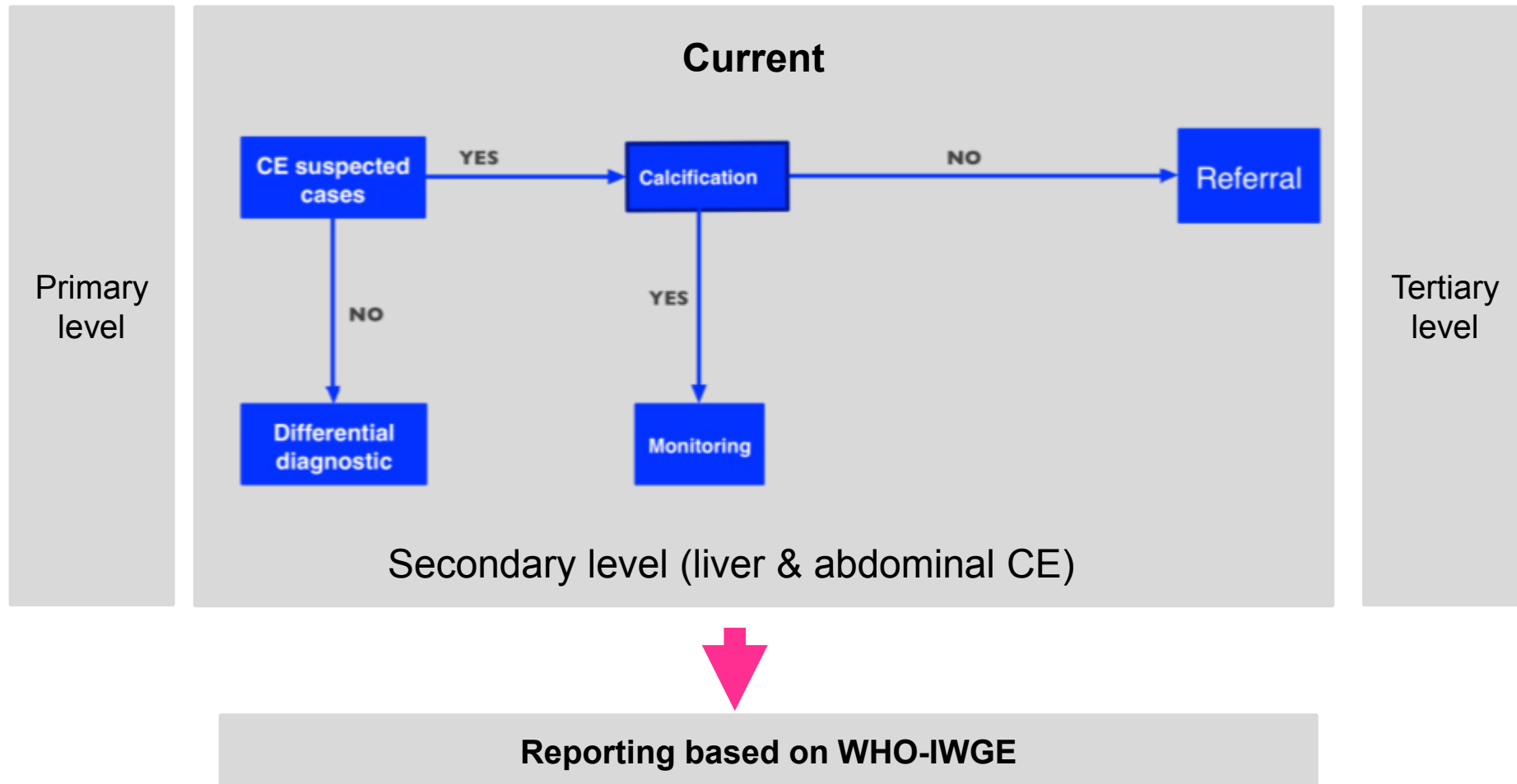
Introduction of WHO-IWGE algorithm by WHO experts, 2016



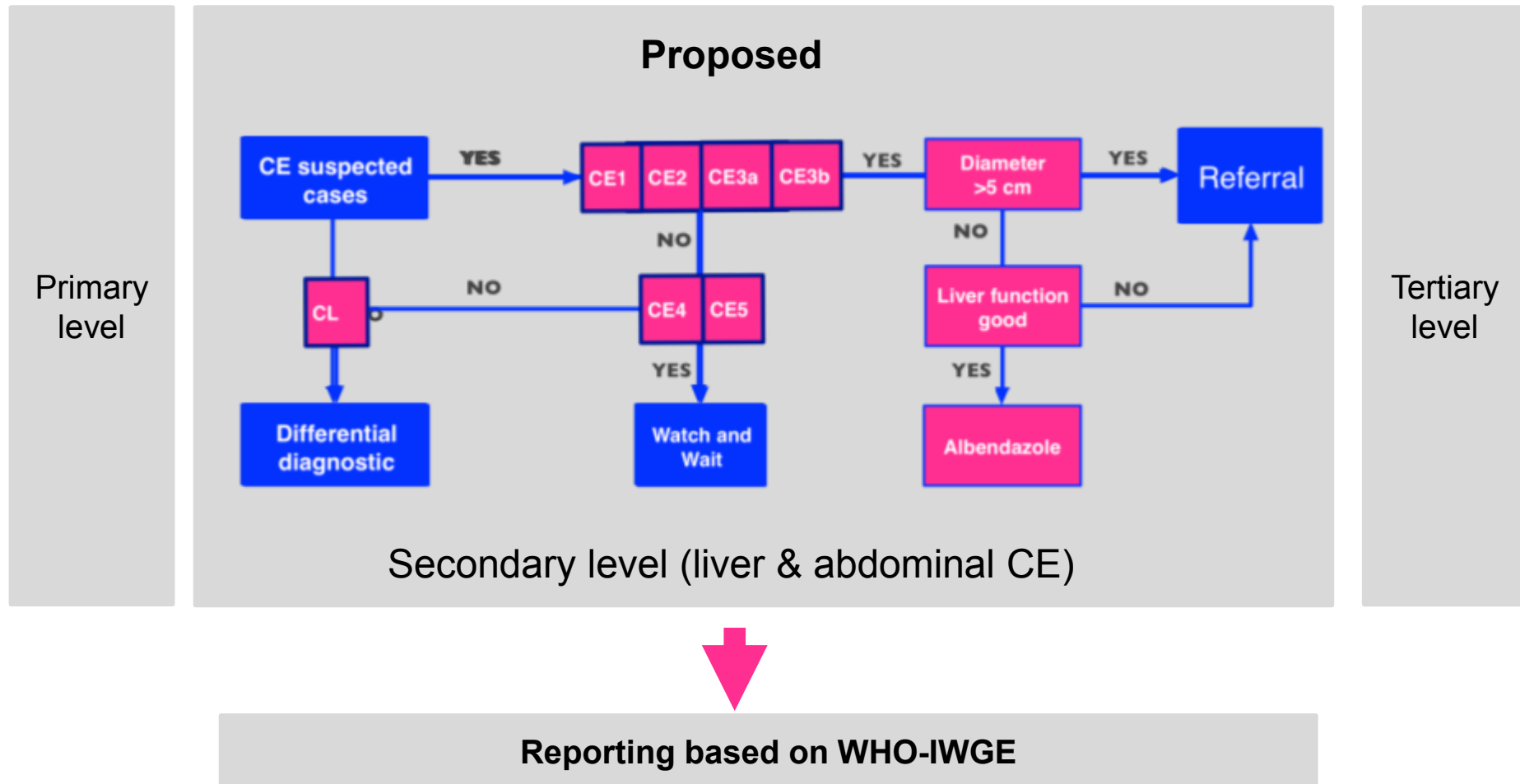
- First Central Hospital, Ulaanbaatar
- Secondary hospital of “Omno gobi” province



Optimize the clinical algorithm of CE in Mongolia



Optimize the clinical algorithm of CE in Mongolia



- **First estimate of burden of CE in Mongolia:**
 - Substantial number of people are affected by CE in Mongolia
 - Incidence of diagnosed cases is 7 times higher than incidence of surgical cases
- **First estimate of societal cost of CE in Mongolia:**
 - Impact on household economy and poverty
 - Needs control measures to prevent future cost
- **Insight into the zoonotic linkage:**
 - Camel (*Camelus bactrianus*) is an important intermediate host of CE in Mongolia and
- **Clinical management is reviewed:**
 - CE staging is not practiced
 - Radiologist in secondary level hospital are the key personnel for detecting and reporting
 - Lack of albendazole supply is the first barrier for improvement

Transdisciplinary workshops & trainings

The stakeholder workshop on **clinical management** and surveillance of CE, Ulaanbaatar, Mongolia, Sep 2016



- **Clinical management, hospital based surveillance system**
 - Training the clinicians/radiologists on WHO-IWGE algorithm
 - SOPs for clinical management and reporting of CE based on WHO-IWGE algorithm
 - Improve the supply and availability of albendazole

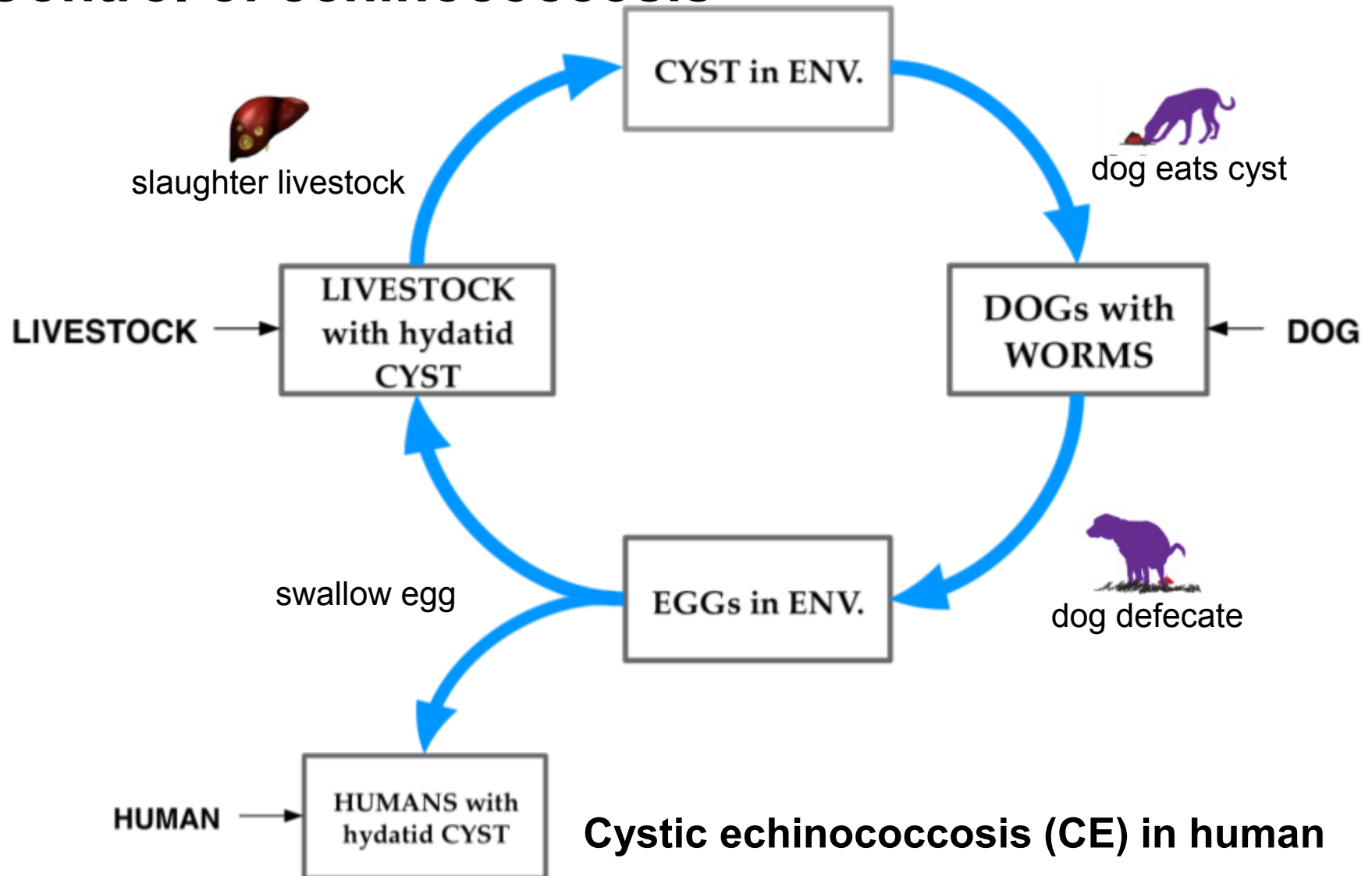
Transdisciplinary workshops & trainings

The stakeholder workshop on **control of echinococcosis**,
MoH, Ulaanbaatar, Mongolia, Oct 2018,

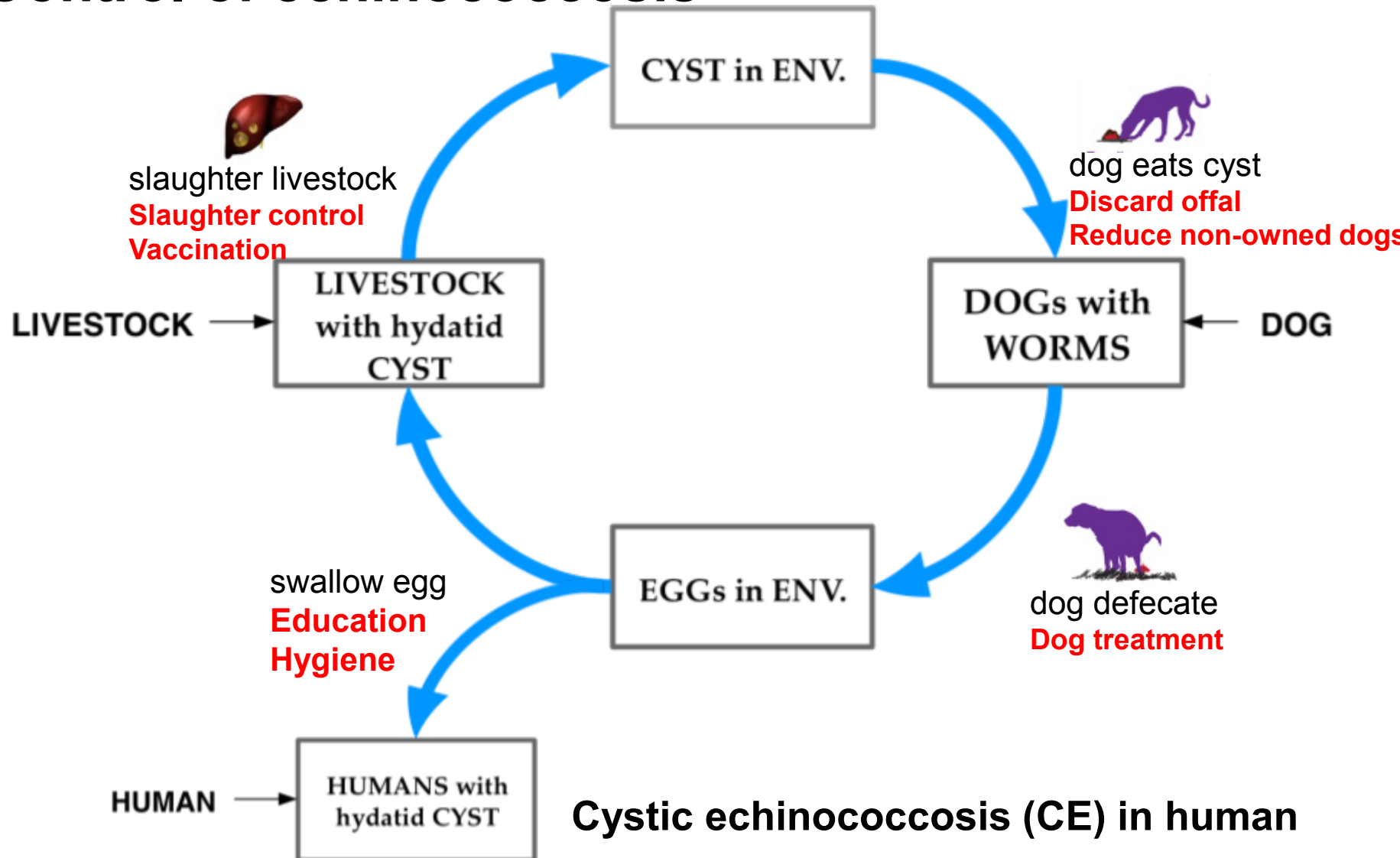


Draft of Action Plan for control of CE was discussed

Control of echinococcosis



Control of echinococcosis



Lessons learnt from previous implementation

Important areas to be improved before any control activity

- Coordination mechanism
- Commitment from all stakeholders
- Communication between sectors
- Common vision
- Scientific evidence
- International partnership
- Exploration for funding sources

Start from small scale (national level actions likely to get stuck)

Vigorous monitoring techniques required

- Monitor dog treatment: egg counting, coproAntigen test, coproPCR tests
- Monitor vaccination: Necroscopy of >2 years of sheeps
- Monitor in human: US screening of children under 18 years of age

Integrate with other programs

- WASH
- Rabies program

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