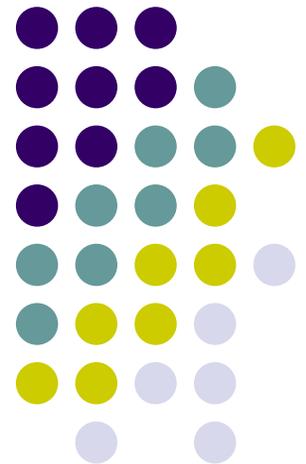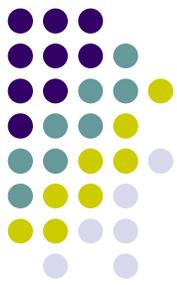# 健保資料庫應用於臨床預防政策之分析評估

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Clinical Prevention

- Clinical preventive services:
    - Immunization
    - Cancer screening
- Evidence-based recommendations
- Criteria for successful preventive interventions, e.g., effectiveness, benefits and harms, barriers, cost, acceptance by patient

Threat-Responsiveness and the Decision to Obtain Free Influenza Vaccinations among the Older Adults in Taiwan
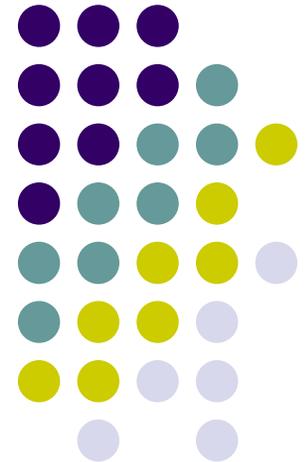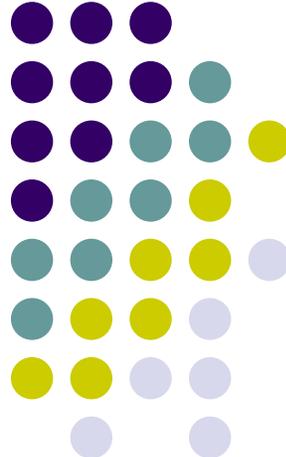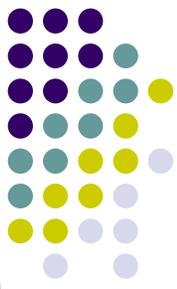
Content

- Introduction
- Research Methods
- Results
- Discussion
- Limitation
- Conclusion

Introduction

Introduction

- Influenza poses a significant threat to the health of the older adults and presents a critical disease burden to health care delivery system around the world (WHO, 2003).

- Studies have shown influenza vaccination is a safe, effective, and efficient method for preventing influenza-related complications in older adult populations (Nichol, 2001).

- However, the vaccination rates do not reach the number of people targeted to receive them in many countries (Fedson,1997).
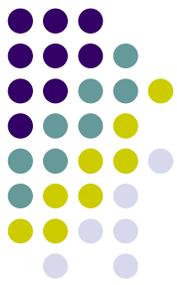
Introduction (cont.)

- In Taiwan, free influenza vaccination was provided for people 65 years or older since 2001. But the number of people who use these services are much fewer than expected. (Department of Health, Executive Yuan, R.O.C. 2005)

- Vaccination rate goal of 68% for older adults by 2010.

- Public health authorities and policy makers may be interested in what other factors may be involved in the decision of an older adult to obtain an influenza vaccination.
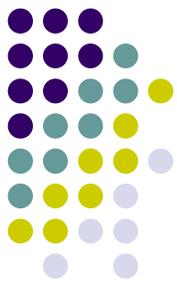
Introduction (cont.)

- Threat-responsiveness is the hypothesis that individuals will alter their prevention behaviors when threat is perceived.

- Threat-responsiveness can be interpreted as fear of sickness.

- It is assumed the greater the prevalence of disease, the greater the perceived threat and the greater the level of prevention.
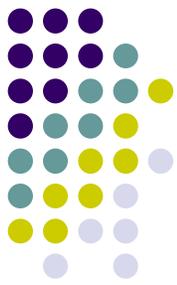
Introduction (cont.)

- It has been found, for example, to influence whether a person would take measures to prevent infectious diseases such as influenza, measles, or AIDS.

- Previous study found perceived risk to predict whether individuals would obtain influenza vaccinations in an elderly population (Zimerman,2003).
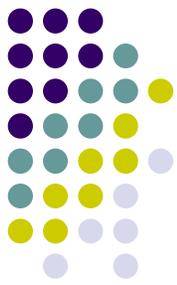
Introduction (cont.)

- Few have empirically tested the influence of perceived threat on utilization of preventive medicine on a national level.

- Using national health insurance claims data, we studied the association between threat-responsiveness, represented by *prior influenza vaccinations* and *prior visits to physicians for flu-like respiratory conditions*, and the decision to receive influenza vaccinations during a current epidemic season in Taiwan.

Research Methods
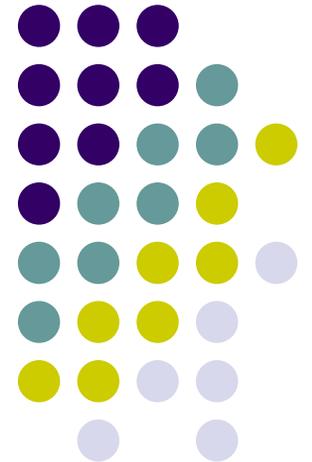
Conceptual Framework
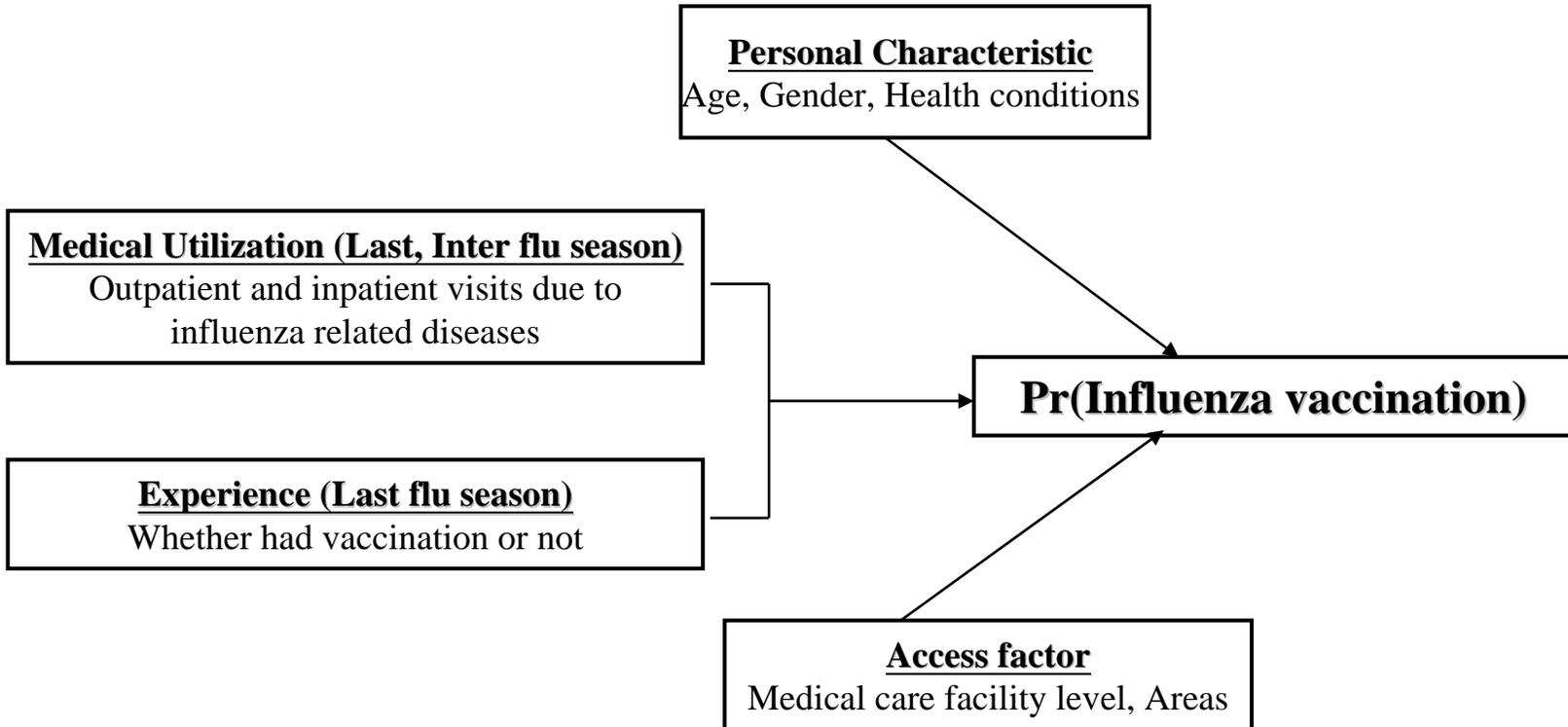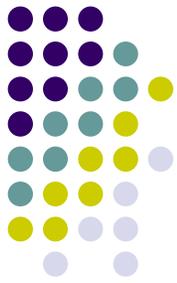
Data
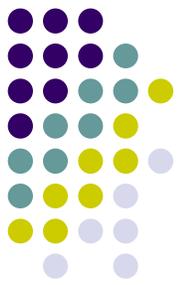
- Random sample of Taiwan's National Health Insurance claims records which included demographic and health care history, including outpatient records, inpatient records, and information about the medical facilities they visited during the study period (2002-2004 influenza season).

- The final sample is 23,023 people who aged over 65 years old.
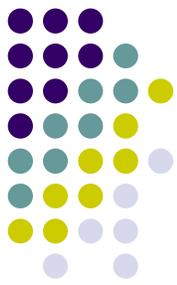
Data (cont.)

- A subject was categorized as vaccinated or unvaccinated.

- Person's utilization of outpatient or inpatient services for flu-like acute and chronic respiratory conditions
  - Prior influenza season
  - Interim (non-epidemic) season
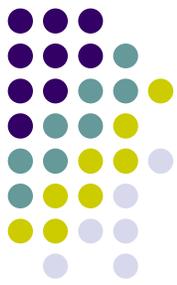
Data (cont.)

- Age

- Gender

- Number of chronic diseases
  - WHO recommended for influenza vaccination: diabetes, chronic lung diseases, chronic kidney disease, chronic heart disease, cancer, and immunodeficiency

- This study linked the outpatient claims with inpatient records, and the medical facility with region and hospital level.

Statistical Analysis
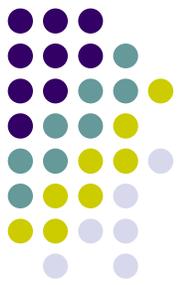
1. Descriptive analyses to characterize individual characteristics and influenza vaccination status at the national level.

2. $$\mathrm{P_r}(V_{it}) = f(V_{it-1}, M_{it-1}, I_{it}, H_{it}, \varepsilon_{it})$$

V= Vaccination status

M= Medical utilizations

I= Individual factors

H= Health care facility factors

Statistical Analysis (cont.)
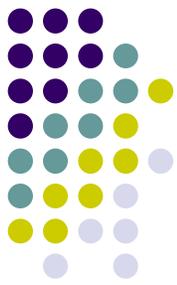
2. Using *multivariate logistic regression*, we analyzed the influence of obtaining a prior influenza vaccination status and frequency of use of medical care services for related respiratory conditions during the prior influenza season or during an interim (non-epidemic) season on the probability that they would receive an influenza vaccination the following influenza season.

3. All statistical operations were performed using STATA 9.2 (College Station, Texas, USA).

Results

Table1. Characteristics of the study sample by influenza vaccination status and influenza seasons

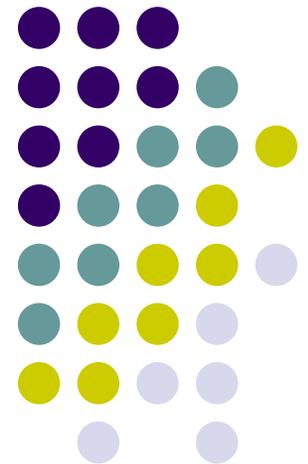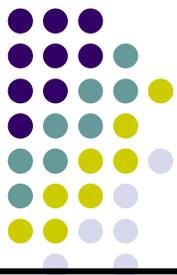| Characteristics %	2002 Unvaccinated (N=134,133)	2002 Vaccinated (N=8,890)	P-value*	2003 Unvaccinated (N=12,829)	2003 Vaccinated (N=10,194)	P-value*	2004 Unvaccinated (N=13,979)	2004 Vaccinated (N=9,044)	P-value*
Age									
65-69	48.2%	32.6%	<0.001	41.5%	32.3%	<0.001	33.3%	31.0%	<0.001
70-74	18.8%	32.5%		19.4%	30.3%		21.6%	30.4%	
75-79	14.8%	20.1%		16.5%	21.6%		18.7%	21.8%	
≧80	18.3%	14.8%		22.6%	15.8%		26.4%	16.9%	
Gender									
Women	49.4%	47.9%	0.028	49.2%	48.4%	0.254	49.1%	48.5%	0.383
Men	50.6%	52.1%		50.8%	51.6%		50.9%	51.5%	
# of chronic disease									
0	23.1%	8.8%	<0.001	23.1%	10.6%	<0.001	21.5%	11.5%	<0.001
1	30.7%	25.9%		29.9%	27.4%		28.6%	29.2%	
2	28.9%	37.3%		28.8%	36.4%		30.0%	35.5%	
≧3	17.4%	28.0%		18.2%	25.6%		19.9%	23.9%	
Received flu shot in last flu season									
No	86.1%	38.1%	<0.001	85.4%	31.2%	<0.001	78.6%	20.4%	<0.001
Yes	14.0%	61.9%		14.7%	68.8%		21.5%	79.6%	

Table1. Characteristics of the study sample by influenza vaccination status and influenza seasons
(cont.)

Characteristics %	2002			2003			2004		
	Unvaccinated (N=134,133)	Vaccinated (N=8,890)	*P*-value*	Unvaccinated (N=12,829)	Vaccinated (N=10,194)	*P*-value*	Unvaccinated (N=13,979)	Vaccinated (N=9,044)	*P*-value*
# of outpatient visits in last flu season									
0	83.2%	66.4%	<0.001	82.4%	67.1%	<0.001	81.4%	68.6%	<0.001
1	6.7%	12.1%		6.8%	12.0%		6.9%	11.4%	
≧2	10.1%	22.6%		10.9%	21.0%		11.6%	20.0%	
# of outpatient visits in interim season									
0	74.4%	52.2%	<0.001	74.7%	54.5%	<0.001	72.7%	55.8%	<0.001
1	8.8%	13.7%		8.3%	13.7%		8.9%	14.1%	
≧2	16.8%	34.1%		17.0%	31.9%		18.4%	30.1%	
#of hospitalizations in last flu season									
0	97.3%	97.8%	0.006	96.6%	97.9%	<0.001	96.7%	97.9%	<0.001
1	1.9%	1.8%		2.4%	1.8%		2.3%	1.7%	
≧2	0.8%	0.4%		1.0%	0.3%		1.0%	0.4%	

Table1. Characteristics of the study sample by influenza vaccination status and influenza seasons (cont.)

| Characteristics%	2002			2003			2004		
	Unvaccinated (N=134,133)	Vaccinated (N=8,890)	*P*-value*	Unvaccinated (N=12,829)	Vaccinated (N=10,194)	*P*-value*	Unvaccinated (N=13,979)	Vaccinated (N=9,044)	*P*-value*
# of hospitalizations in interim season									
0	94.4%	95.7%	<0.001	93.4%	95.9%	<0.001	93.5%	96.0%	<0.001
1	3.6%	3.0%		4.3%	3.2%		4.1%	2.9%	
≧2	2.0%	1.3%		2.4%	0.9%		2.4%	1.1%	
Most common place for medical care									
Medical center	14.3%	2.9%	<0.001	14.2%	3.7%	<0.001	14.3%	3.2%	<0.001
Regional hospital	14.3%	7.1%		14.3%	7.9%		14.2%	7.9%	
District hospital	13.6%	19.1%		14.3%	20.0%		14.6%	18.2%	
Clinic	57.8%	71.0%		57.2%	68.5%		57.0%	70.8%	
Region									
North	45.6%	34.5%	<0.001	44.7%	37.0%	<0.001	45.0%	35.7%	<0.001
Central	22.3%	29.0%		22.1%	28.6%		22.1%	29.0%	
South	28.0%	32.5%		29.0%	30.6%		28.6%	31.4%	
East	4.2%	4.0%		4.3%	3.9%		4.3%	3.9%	

Table 2. Adjusted odds ratios (ORs) and 95% CIs for influenza vaccination associated with prior influenza vaccination status and related medical care utilizations
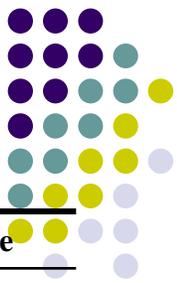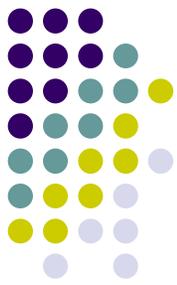
Variables	OR	95% CI	P-value
Received flu shot in last flu season			
No	1.00		
Yes	10.22	9.82-10.64	<0.001
Number of outpatient visits in last flu season			
0	1.00		
1	1.03	0.94-1.13	0.527
≧2	1.11	1.01-1.22	0.034
Number of outpatient visits in interim season			
0	1.00		
1	1.51	1.40-1.63	<0.001
≧2	1.59	1.46-1.73	<0.001
Number of hospitalization in last flu season			
0	1.00		
1	1.06	0.87-1.30	0.549
≧2	0.75	0.52-1.07	0.114
Number of hospitalization in interim season			
0	1.00		
1	0.46	0.40-0.53	<0.001
≧2	0.28	0.22-0.36	<0.001

Table 2. Adjusted odds ratios (ORs) and 95% CIs for influenza vaccination associated with prior influenza vaccination status and related medical care utilizations (cont.)
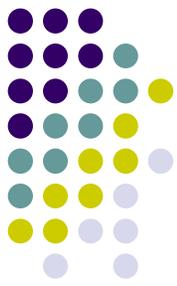
Variables	OR	95% CI	*P*-value
Common place for medical care			
Medical center	1.00		
Regional hosp	2.48	2.25-2.74	<0.001
District hosp	5.54	5.05-6.08	<0.001
Clinic	4.94	4.54-5.37	<0.001
Age			
65-69	1.00		
70-74	1.23	1.17-1.30	<0.001
75-79	1.02	0.97-1.08	0.478
≧80	0.68	0.64-0.72	<0.001
Gender			
Women	1.00		
Men	1.09	1.05-1.13	<0.001

Table 2. Adjusted odds ratios (ORs) and 95% CIs for influenza vaccination associated with prior influenza vaccination status and related medical care utilizations (cont.)
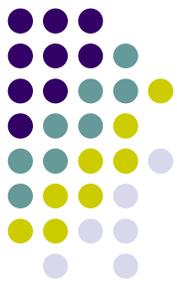
| Variables	OR	95% CI	P-value
Number of chronic disease			
0	1.00		
1	1.68	1.59-1.78	<0.001
2	1.89	1.79-12.00	<0.001
≧3	1.91	1.79-2.04	<0.001
Region			
North	1.00		
Central	1.33	1.27-1.40	<0.001
South	1.14	1.09-1.20	<0.001
East	0.97	0.88-1.07	0.571
Year			
2002	1.00		
2003	1.18	1.13-1.24	<0.001
2004	0.74	0.71-0.78	<0.001

Discussion
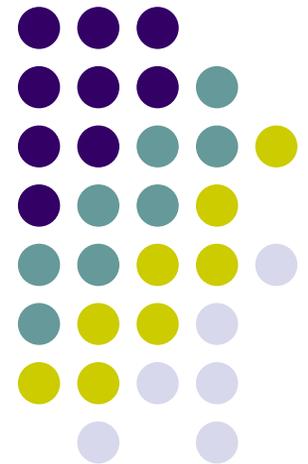
Discussion

- Prior influenza vaccination, number of prior outpatient visits for the flu-like respiratory conditions to be the most significant predictors

- Perceived threat is a significant predictors of vaccination status among the older adults
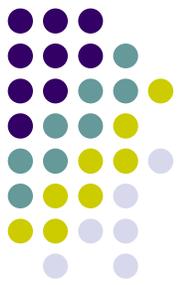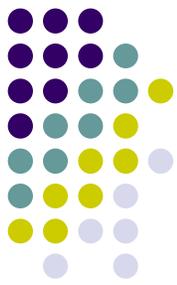
Discussion

- Older adults who received influenza vaccination during the prior influenza season to be significantly more likely to decide to obtain another the following season.

- This trend is consistent with findings of studies done in Hong Kong and Spain, though ours found a much greater influence from this factor.
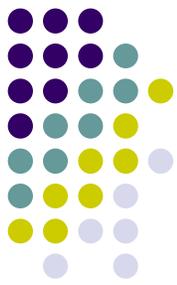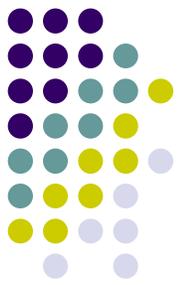
Discussion (cont.)

- Frequency of outpatient visits for flu-like respiratory complaints during the previous influenza season and interim season to have had a significantly positive effect of the likelihood that people would decide to obtain a vaccination.

- Our study, therefore, used frequency of utilization of such services as proxy representing a participant's threat-responsiveness
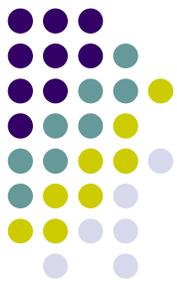
Discussion (cont.)

- Patients using medical utilizations during the interim season, were more likely than those using them during the prior influenza season to obtain a vaccination, suggesting that our subjects responded to more immediate disease threats, as was found by one other previous study (Li,2004).

- Similar to other studies, the patients who had more chronic diseases in our study were more likely to obtain influenza vaccinations than those who did not (Andrew ,2004).
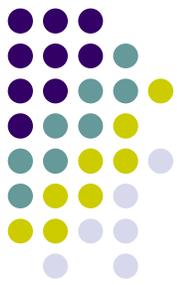
Discussion (cont.)

- Surprisingly, our oldest group (age 80 or over) were significantly less likely than our youngest group to obtain a vaccination ($p<0.01$).

- It might because the oldest are most vulnerable during the influenza season, more effort needs to be devoted to encouraging their participation in the prevention program.

Discussion (cont.)

- Older men were more likely than older women to obtain influenza vaccination in our study ($p<0.01$), a finding not always consistent with previous studies regard the influence of gender of this decision.

- This difference might be a result of racial/ethnics, differences in age, differences in chronic diseases, or even differences level of apprehension of getting along independently outside, though these hypotheses would requires further study to confirm.

Discussion (cont.)

- Previous studies directly exploring key factors associated with decisions to obtain influenza vaccinations have focused more on individual demographic characteristics, health status, socio-economic status or health insurance coverage (Jiménez-García ,2005).

- Many of those studies were conducted using surveys, have had some problems with such limitations as recall bias (Mac Donald R, 1999).

- Our use of claims records helps avoid potential flaws related to recall.
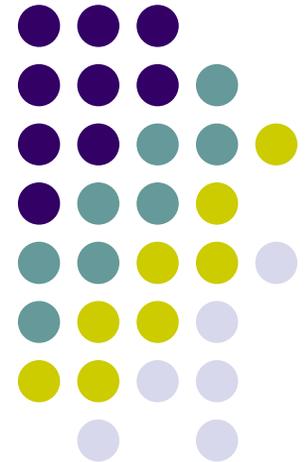
Limitations
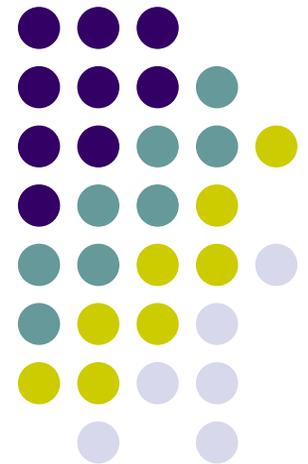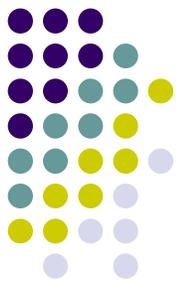
Limitations

- Claims data cannot provide detailed information regarding the socio-economic level, lifestyle and health behavior of the older subjects.

- Future studies might want to link detail individual data collected from surveys with medical claims records to do a more comprehensive analysis.

International Comparisons

International Comparisons
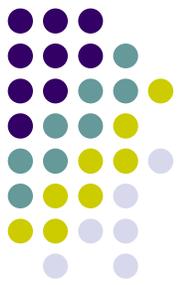
- For similar study periods: US 65%, Canada 62%, Australia 79%

- European countries: Netherlands 74%, UK 73%, Spain 69%, France 67%, Germany 55%

- Differences in health care delivery system, health insurance coverage, social/cultural factors, demographic characteristics need to be taken into consideration.
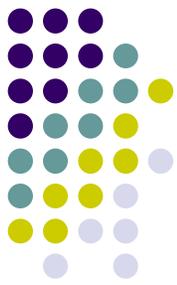
International Comparisons
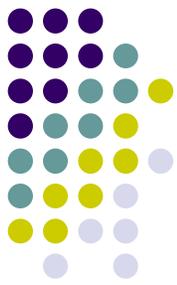
- Taiwan has universal health care coverage increases access to care and reduces economic barriers.

- A comparison of countries reveals that there is enough room for further vaccination rate increases among older adults in Taiwan
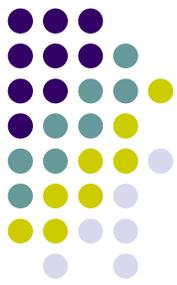
Conclusion
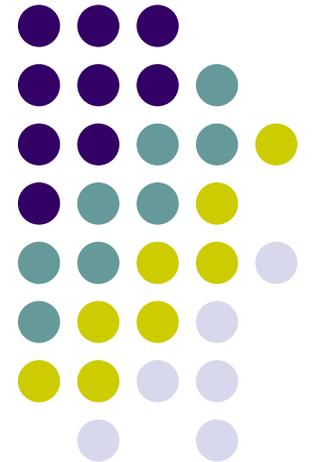
Conclusion

- Free vaccination coverage does not guarantee high vaccination rates.

- Continual ongoing public health interventions may be necessary in order to generate optimal vaccination rates.

- Prior influenza vaccination, frequency of prior outpatient visits for flu-like respiratory conditions (interim season) significantly predict the vaccination status of an older adult.
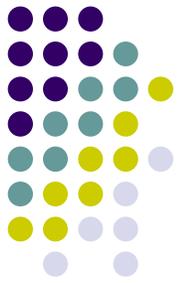
Conclusion (cont.)

- Perceived threat is a significant predictor of vaccination status among the older adults.

- These findings might help design public policies and campaign to increase the vaccination rate of this vulnerable group of citizens.

- In particular, older adults who never had influenza vaccinations can be identified, educated and encouraged to participate in this important program.

Thanks for your attention!

Appendix

Conceptual Framework (cont.)

Previous Influenza Season (10/1- 4/30)

Inter-season (5/1-9/30)

Influenza Season (10/1- 4/30)

Far from FS

Close to FS

Flu season (FS)

* Frequency of Last Season's
Outpatient Visits & Hospitalization
*Previous Vaccination Status

*Frequency of Inter-Season's
Outpatient Visits & Hospitalization

*Vaccination Status