



Safe Community & Healthy City



Safe Community is Cost Effectiveness

Kwai Tsing Experience

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1- Princess Margaret Hospital, 2- Kwai Tsing Safe Community and Health City Association, 3-Kwai Tsing District Council

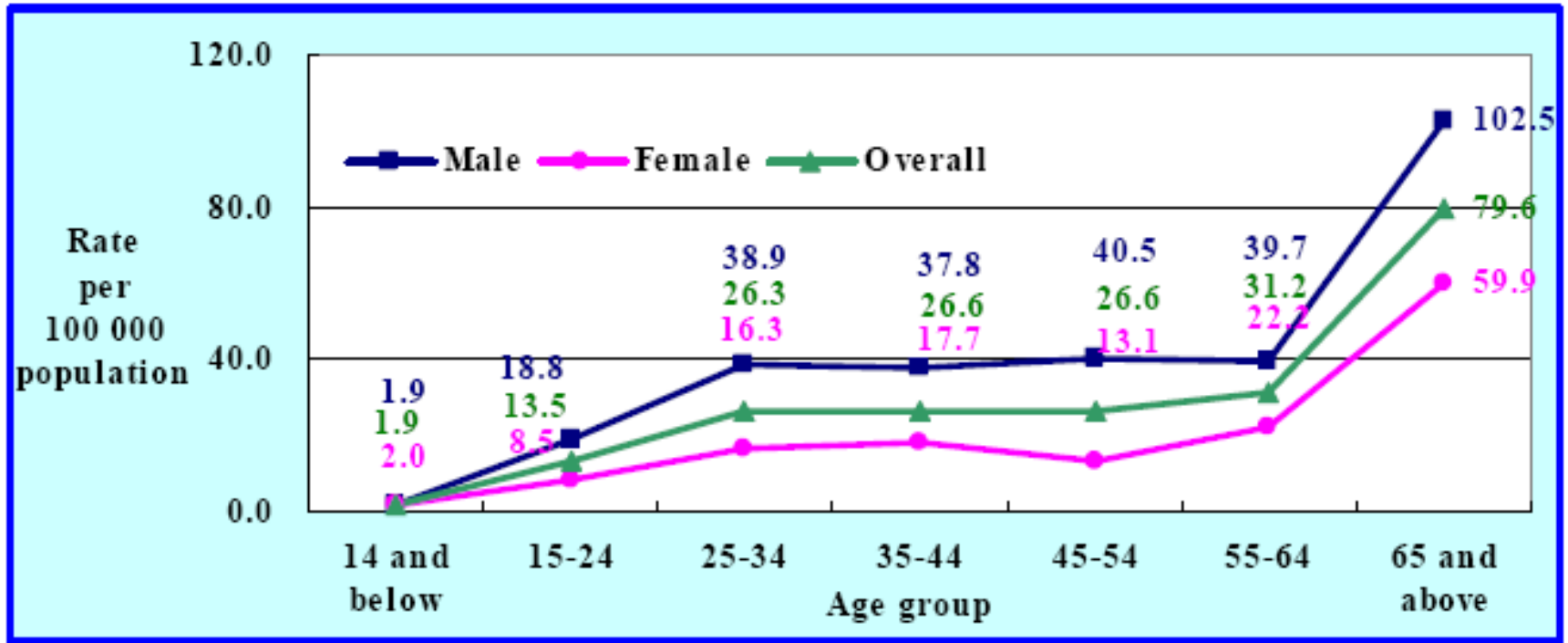
Centre on Injury Prevention and Safety Promotion, Kwai Tsing Safe Community and Healthy City



Summary

- Health care cost of injuries is tremendous
 - HK\$ 4,389 million for years production life loss
 - HK\$ 2,070 million direct injury cost per year
 - ? Indirect cost – usually > 3x of direct medical cost
- Injury can be prevented
- Kwai Tsing Safe Community has achieved a reduction of 30% of injuries in 5 years through strategically planned projects with collaborative efforts among all sectors in the community with a cost benefit ratio of >> 5
- New strategy basing on a GIS injury surveillance will be described

Injury death rates by sex and age group ,2006 (HK)



Note: * Rate per 100 000 population of respective sex and age group.

Sources: Department of Health; Census and Statistics Department.

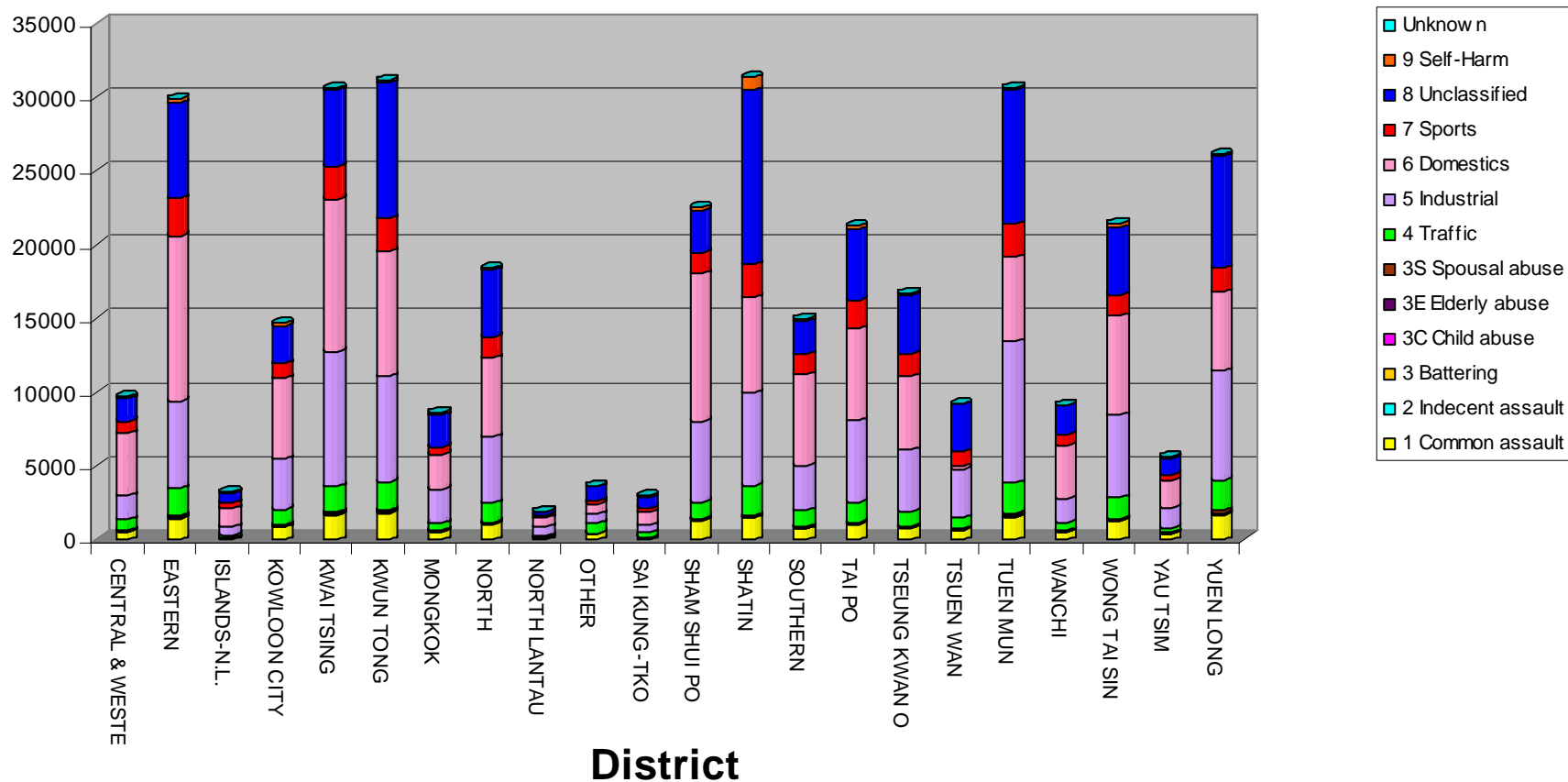
Estimated production life loss from injury mortalities 2006

- No. of mortalities below the age of 65: 1,274^ψ
- Total loss of working period: 31,230 years
- Average production loss: 24.5 years
- Mean wage as at Sept 2007: HK\$ 11,712/month^σ (manufacturing)
- Estimated production loss: HK\$11,712/month * 12months * 31,230

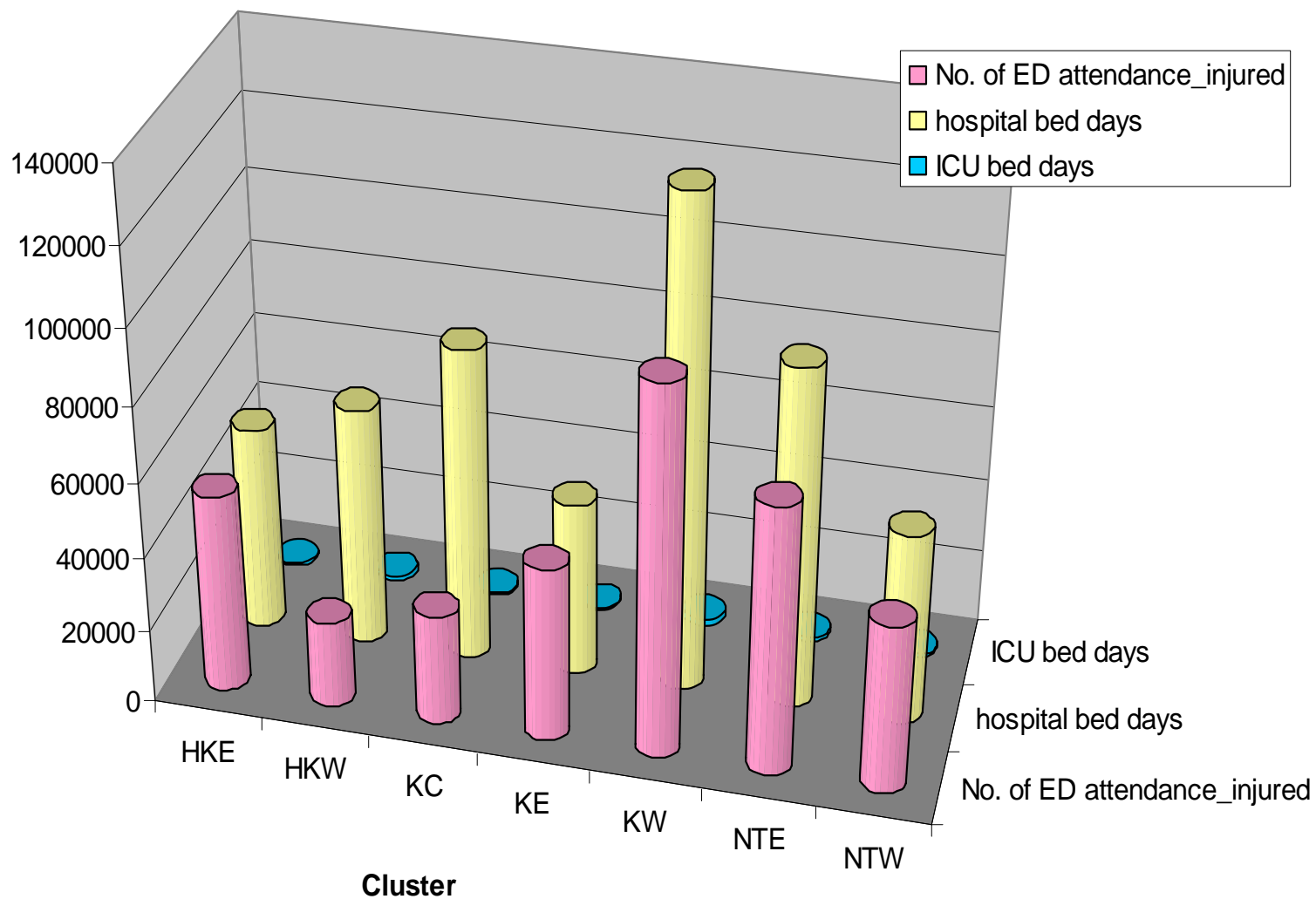
>> HK\$ 4,389 million<<

^σ Median Monthly Income from Main Employment , census and statistic department
^ψ Registered Injured Mortalities

Annual case load of Injury type vs District



Average annual injured case load and bed days 2000-2007



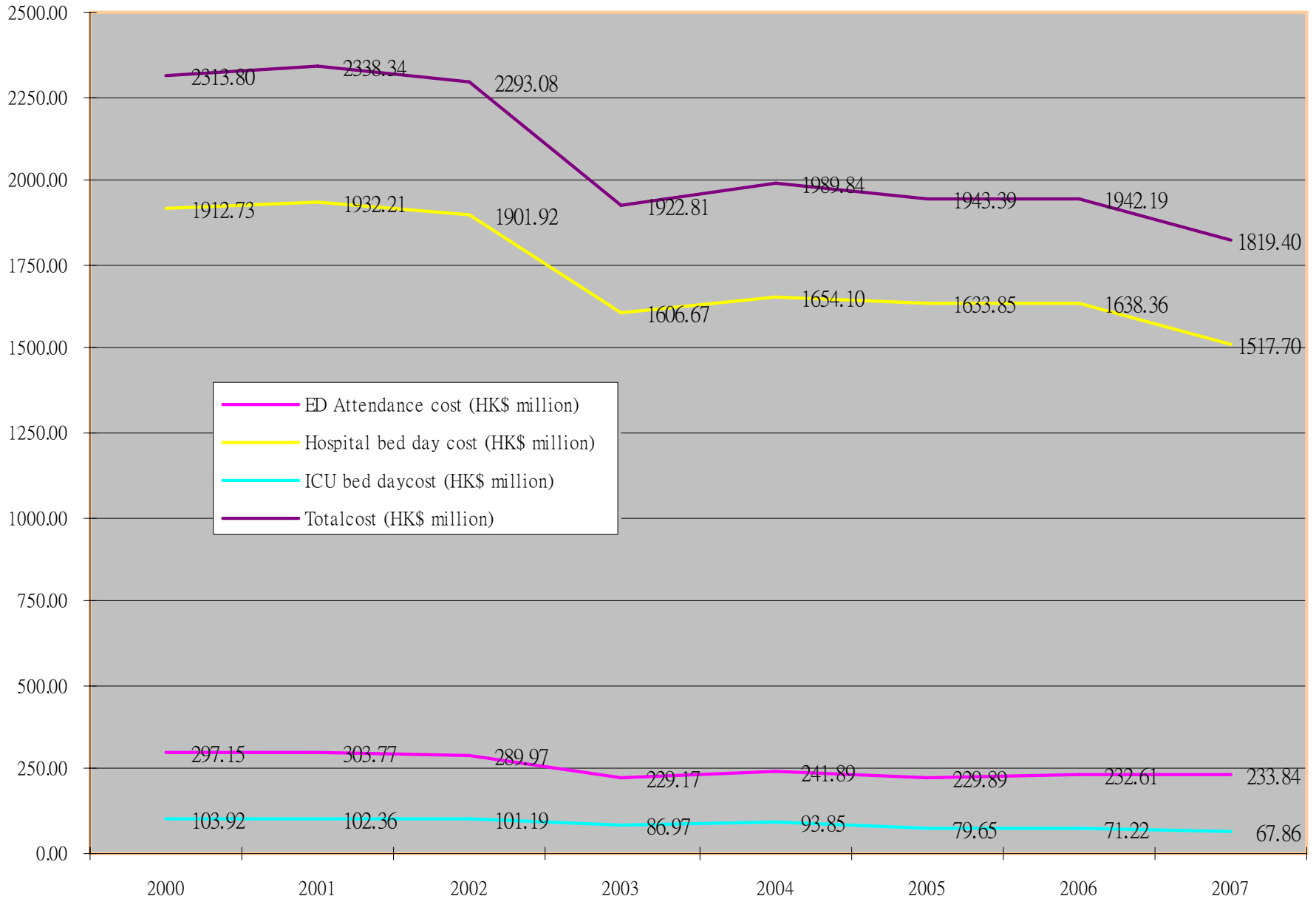
Cost impact on ED attendance, hospital bed days and ICU bed days

Year	ED Attendance cost (HK\$ Million)	Hospital bed day cost (HK\$ Million)	ICU bed day Cost (HK\$ Million)	Total cost (HK\$ Million)
2000	297.15	1,912.73	103.92	2,313.80
2001	303.77	1,932.21	102.36	2,338.34
2002	289.97	1,901.92	101.19	2,293.08
2003	229.17	1,606.67	86.97	1,922.81
2004	241.89	1,654.10	93.85	1,989.84
2005	229.89	1,633.85	79.65	1,943.39
2006	232.61	1,638.36	71.22	1,942.19
2007	233.84	1,517.70	67.86	1,819.40
Average	257.29	1,724.69	88.38	2,070.36

HK\$ 2,070 million direct injury cost per year

Source: CDARS A&E attendance analysis
Inpatient cohort analysis
HA statistic report 2000-2006

Trend analysis of injury related hospital cost



HK \$5.4 million per 1,000 injury related ED attendance

Resource consumption	Cost estimation
1,000 ED attendance	HK\$ 700,000.00
130 hospital admissions	-----
38 related Emergency operations	-----
1,427 hospital bed days (average LOS :10.98)	HK\$ 4,709,100.00
17 ICU bed days (0.13 day / admission)	HK\$ 236,300.00
Total cost	HK\$ 5,409,100.00

Predicted cost reduction by % of injury related ED attendance

	Predicted cost reduction				
	1%	5%	10%	15%	20%
Reduced no. of ED attendance	3676	18380	36760	55140	73520
Reduced no. of Hospital admissions	471	2355	4710	7065	9420
Reduced no. of emergency operations	136	680	1360	2040	2720
Reduced no. of Hospital Bed day consumptions	5115	25575	51150	76725	102300
Reduced no. of ICU bed day consumptions	61	305	610	915	1220
Injury cost saving (HK\$ million)	20.3	101.5	203.0	304.5	406.0

Injury ~~=~~ Accident

Injury could be prevented

A large suspension bridge with two tall towers and multiple stay cables, spanning a wide body of water. The bridge deck is visible, and the water is in the foreground. The sky is bright and overcast. The text "Kwai Tsing Experience" is overlaid in the center of the image in a bold, black, sans-serif font.

Kwai Tsing Experience



Department of Public Health Sciences

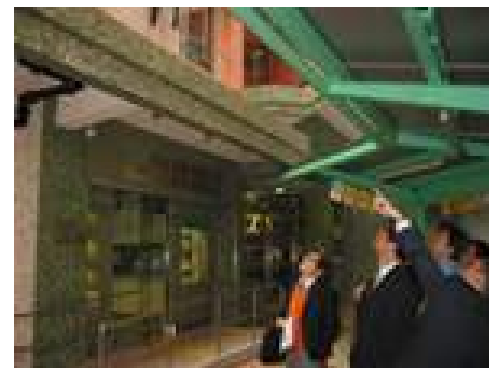
Division of
Social Medicine

WHO Collaborating Centre on Community Safety Promotion

Safe Communities

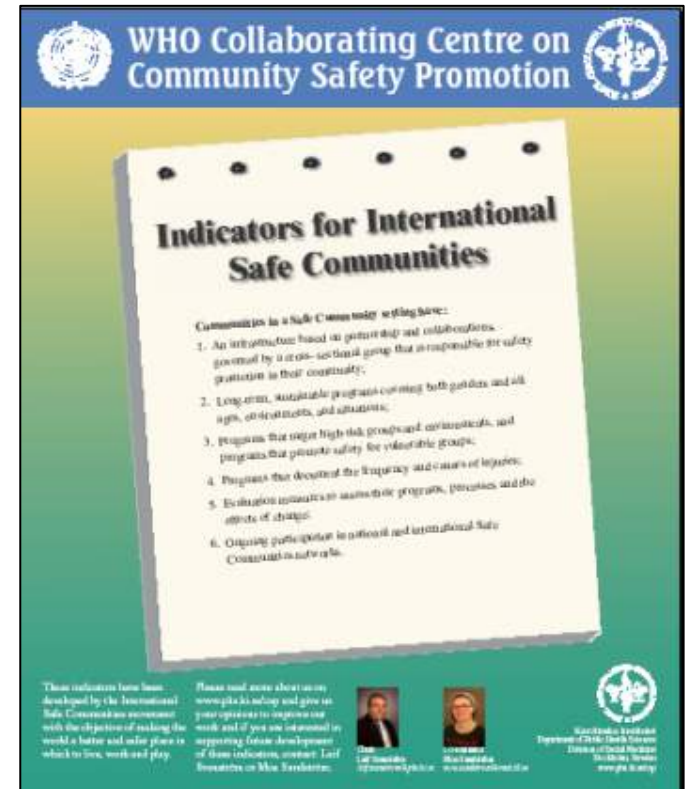
A “ Safe Community” can be a: Municipality; a County; a City or a District of a City working with safety promotion, Injury-, Violence- , Suicide- and Natural Disaster prevention, covering all age groups, gender and areas and is a part of an international network of accredited programmes.

Coordinate resources in Kwai Tsing Community to conduct comprehensive and systematic community diagnosis , then identify , develop and implement promotional and educational improvement program to reduce injuries and promote health in the community.



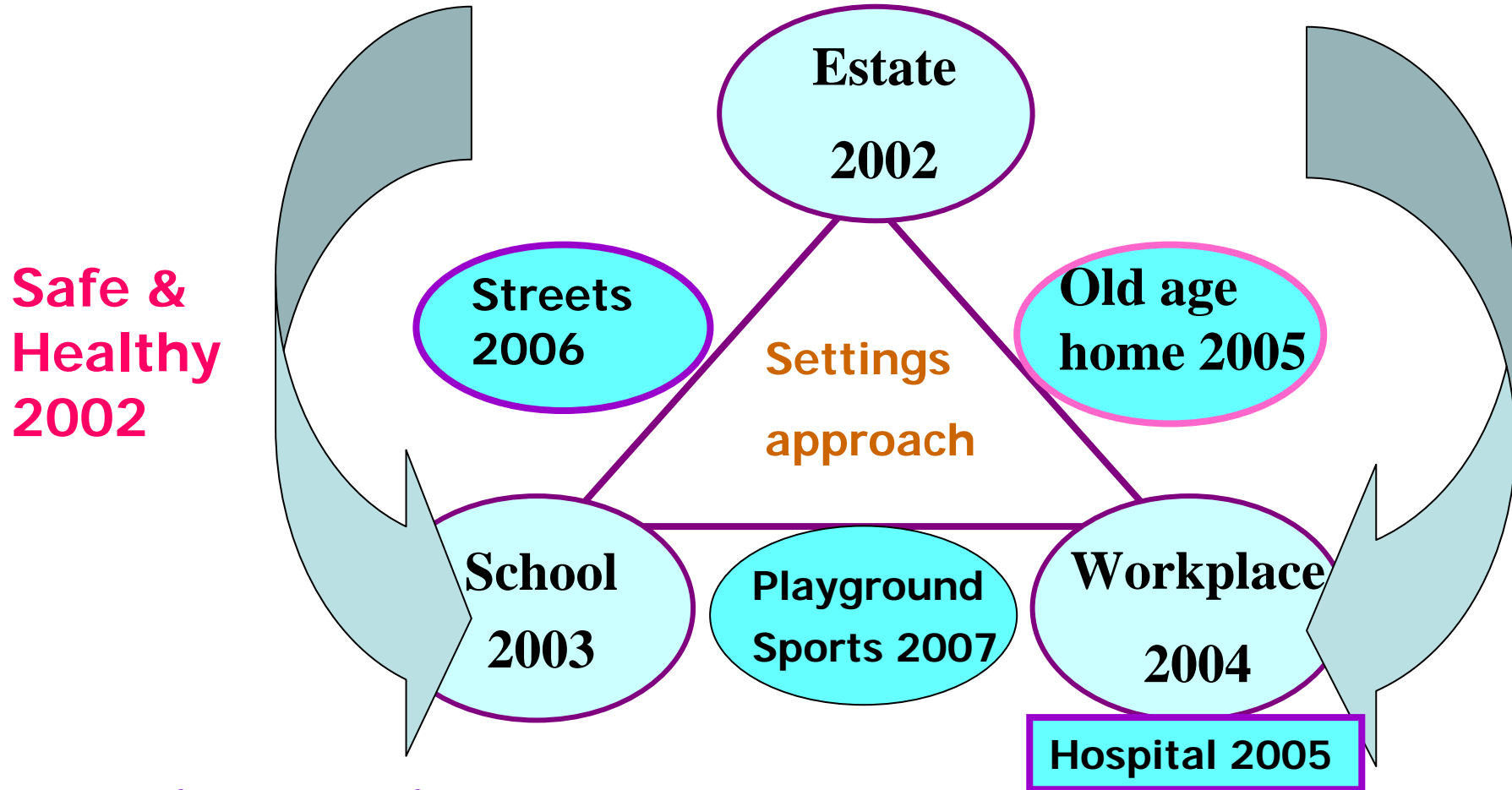
Safe Communities have:

- An **infrastructure** based on partnership and collaborations, governed by a cross-sectional group that is responsible for safety promotion in their community;
- Long-term, **sustainable programs** covering both genders and all ages, environments, and situations;
- Programs that **target high-risk groups** and environments, and programs that promote safety for vulnerable groups;
- Programs that **document** the frequency and causes of injuries;
- **Evaluation** measures to assess their programs, processes and the effects of change;
- **Ongoing participation** in national and international Safe Communities networks.



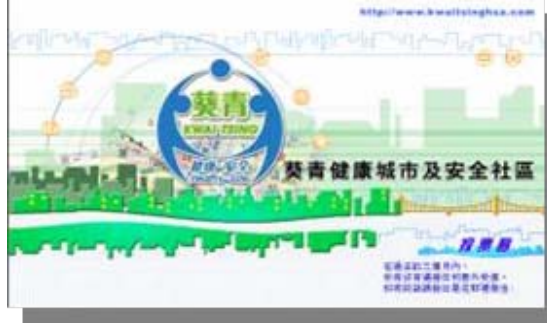
Safety for ALL - 2000

Child	Youth	Adult	Elderly	Home	Road	Crime	Fire
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Community promotion – Nutrition, Exercise, Infection, Fall, Mental health, Emergency response

Safe homes



Safe and Healthy Community

Safe and Healthy Workplaces



Safe & Healthy Estate



Safe Schools

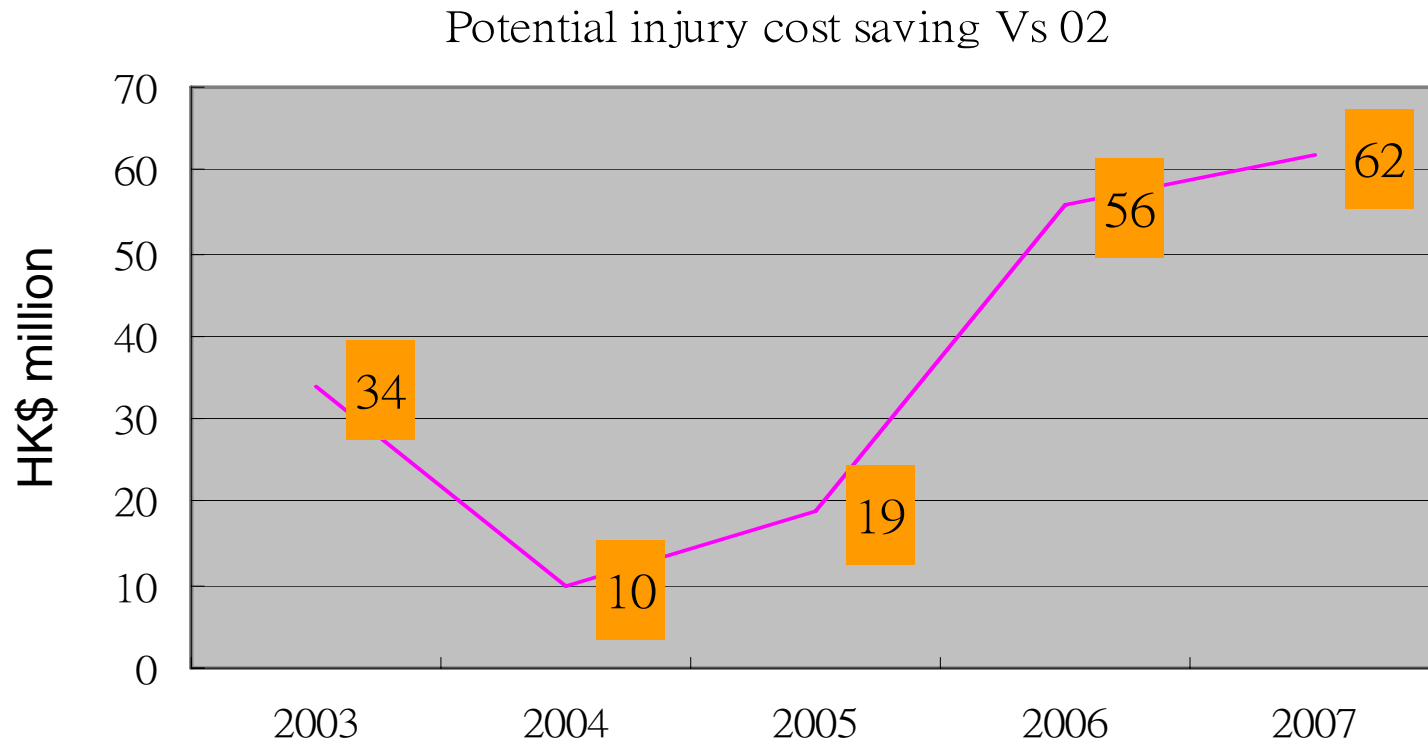
Safe and Healthy Elderly homes





Kwai Tsing Safe Community

- Kwai Tsing has achieved a reduction of 30% of injuries in 5 years through strategically planned projects with collaborative efforts among all sectors in the community.



Estimation of cost benefit ratio

Assume the injury prevention contribute to **20% of the injury cost reduction**

The Cost-Benefit Ratio would be equal to

HK\$ 181,000,000.00 (injury cost saving) * 20% / HK\$ 7,438,179.5 (funding input for 5 yrs)

The gross estimated cost benefit ratio would be **4.87**

(discounted present values are not processed)

Note

- 1) Setup the safety promotion and injury prevention center (HK\$ 200,000.00)
- 2) New GIS injury surveillance system (HK\$800, 000.00)

Safety for ALL - 2000

Child	Youth	Adult	Elderly	Home	Road	Crime	Fire
-------	-------	-------	---------	------	------	-------	------

Injury Database

- AEIS – Accident & Emergency Information System
- CDARS – Hospital admissions
- Child abuse registry of SWD
- Traffic accident database – Police
- Crime rate – Police
- Fire outbreaks – Fire Services Department
- Ad hoc surveys

Step forward - 1:

Establish NEW injury surveillance system based on ICECI at AED

Supported by OSHC 2005

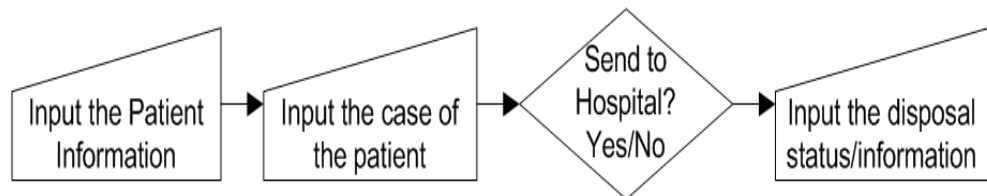
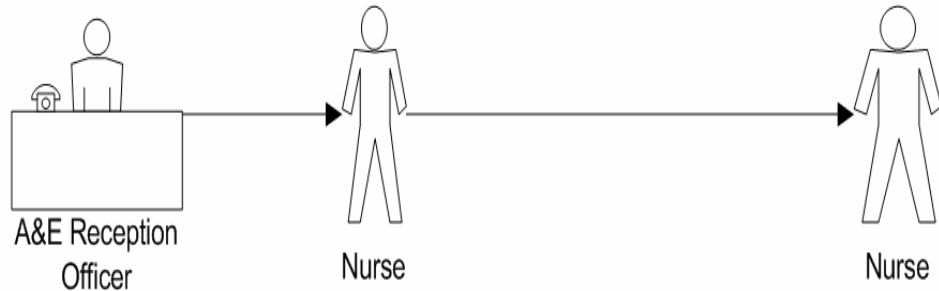
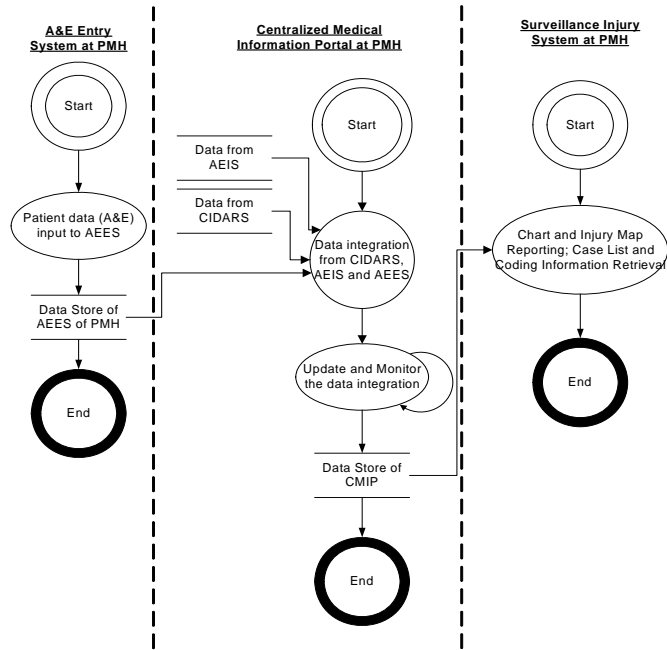
- residential address
- place
- activity
- intent
- mechanism
- nature and type of injury
- severity
- alcohol

Injury surveillance

1. Injury surveillance is a **crucial first step** for reducing the burden of injury worldwide
2. Quantify the **health burden** of injury
3. Quantify the **financial burden** of injury
4. Identify possible risk **factors**
5. Stimulate **epidemiologic research**
6. **Evaluate the effectiveness of injury prevention programs**

System Development

1. Local classification of injury
2. Workflow analysis
3. User interface design
4. Prototype development
5. System evaluation



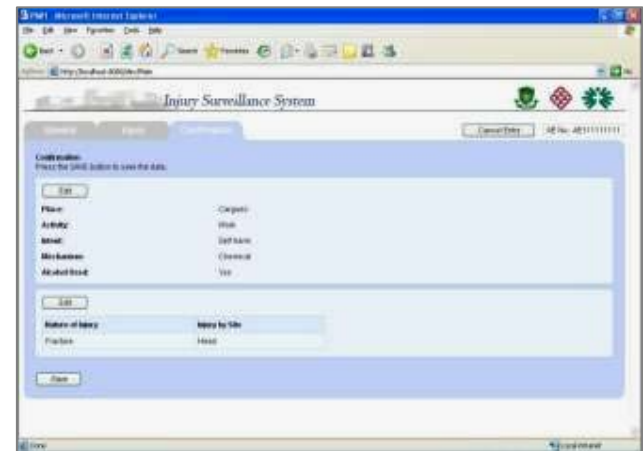
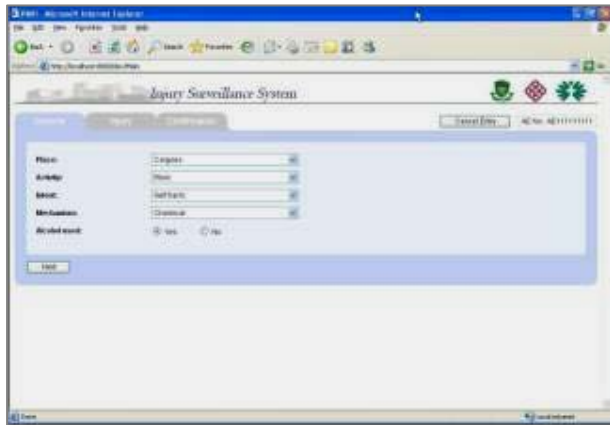
User interface design

Minimal stages for data entry

Fit the actual situation of ED triage process

Simple and efficiency

Time needed: 12 seconds





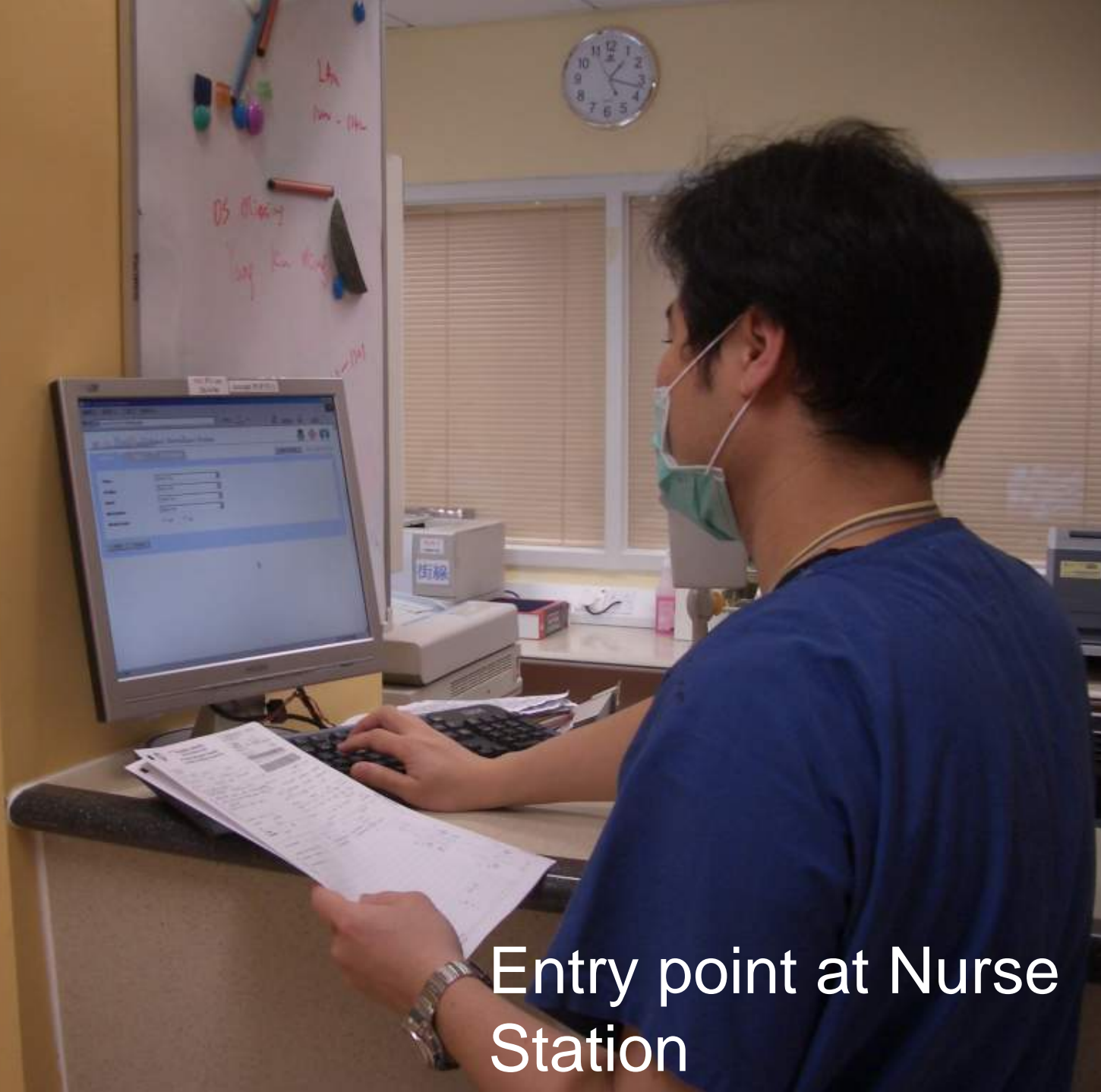
Entry point at Triage Station

→ 醫生/護士樓 1
Doctor/Nurse Station 1

護士樓 1
Nurse Station 1



Entry point at Nurse Station



Entry point at Nurse
Station

Reporting-1

Injury Surveillance Reporting System

Logout | Standard Report | Standard Report (Paid work only) | Report by ICD | Report by Injury Scale | Injury Chart | Injury Map Report | Advanced Search

Injury Surveillance Reporting System > Standard Report

Query Information

Starting Date(DD-MM-YYYY): 01-01-2006 Ending Date(DD-MM-YYYY): 31-12-2006 Zone: All Modify Query Info

Standard Report Type

Total number of injury cases	Average Annual Injury Rate per 1000	Leading causes of injury
Leading Places of occurrence	Leading Activities when injured	Time distribution of injury
Type of injury	Top 5 Leading cause of injury by activity when injured	Top 5 Leading cause of injury by place of occurrence

Standard reporting – preset format



Reporting by ICD injury coding

Injury Surveillance Reporting System > Report by AIS

Query Information

Starting Date(DD-MM-YYYY): 01-01-2006 Ending Date(DD-MM-YYYY): 31-12-2006 Zone: All Age Range: 0-99 Modify Query

Standard Report by AIS

Top 5 Injury by activity

Top 5 Injury by place of occurrence

Click List for 100

Top 5 Injury by Activity

Top 5 Injury by Activity Between 01-01-2006 and 31-12-2006 in All

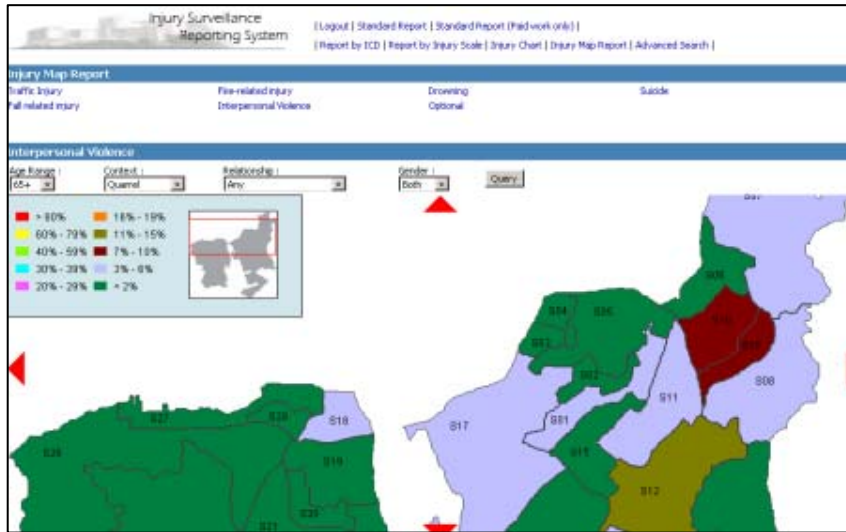
Activity when injured	Count	%	ICD Code	Count	%
...
...
...
...
...

Reporting by AIS scale



Injury charts

Reporting-2



Injury maps

Injury Surveillance Reporting System

Logout | Standard Report | Standard Report (Paid work only) | Report by ICD | Report by Injury Scale | Injury Chart | Injury Map Report | Advanced Search

Demographic Factor

Sex: Both | Age Range: | to: | Zone: All | Date Range: Starting Date (DD-MM-YYYY): 06-11-2006 | Ending Date (DD-MM-YYYY): 06-11-2006

General Factor

Race: All | Ethnicity: All | Intent: All | For Unintentional: Others | Contact: Others | Relationship: | Alcohol: All | Mechanism: All | Transport Type: Others | User Type: Others

Injury Factor

Nature of Injury: All | For Burn Injury: | Burn Degree: Others | Burn Percent: < 0%

Injury Site

Others Unknown Head Abdomen Face

Forearm Neck Back Chest Buttock

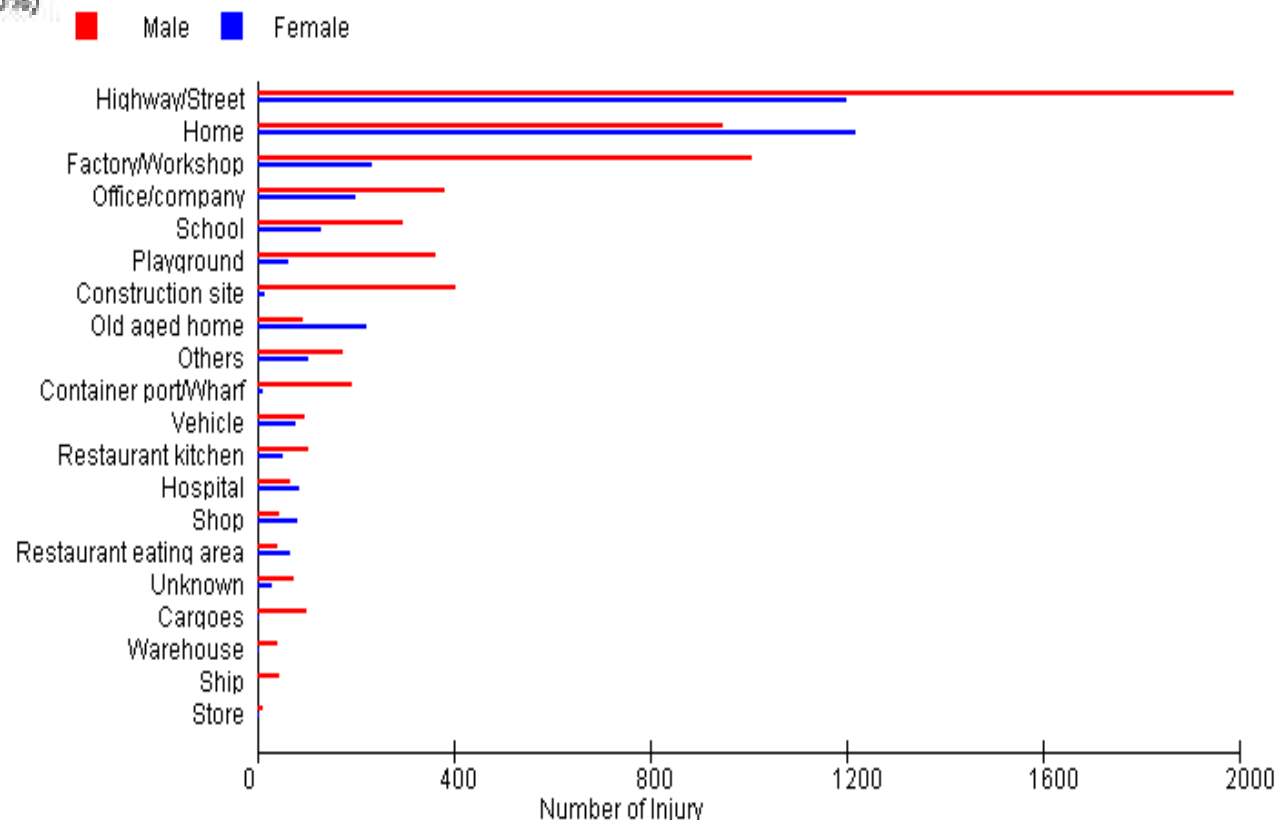
Left: shoulder upper arm forearm elbow wrist fingers leg foot toes hand eye ankle thigh

Right: shoulder upper arm forearm elbow wrist fingers leg foot toes hand eye ankle

Scenario based search

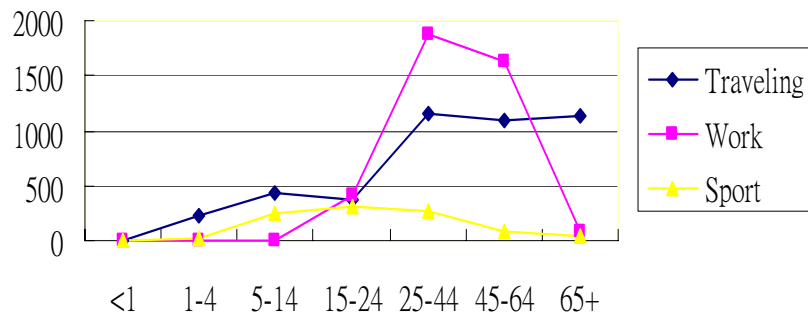
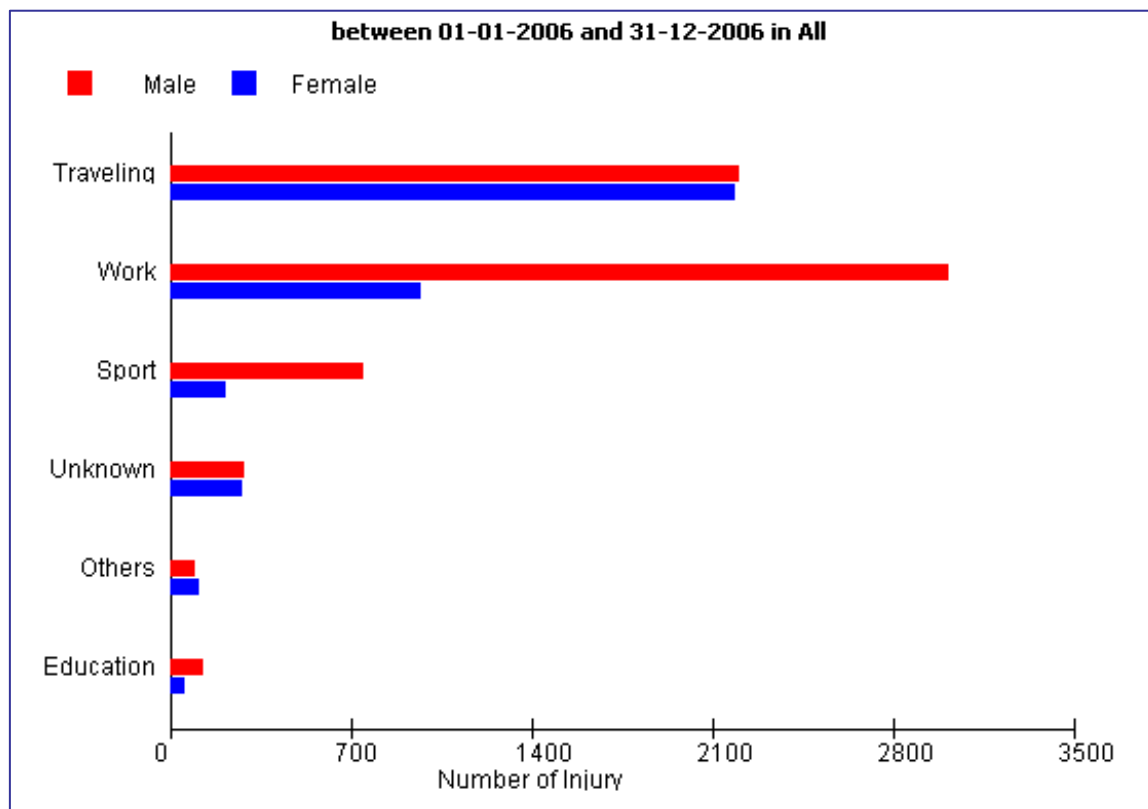
1. Highway/Street(30.86%)
2. Home(21.00%)
3. Factory/Workshop(12.05%)
4. Office/company(5.64%)
5. School(4.15%)
6. Playground(4.15%)
7. Construction site(4.10%)
8. Old aged home(3.10%)
9. Others(2.72%)
10. Container port/Wharf(2.00%)

Number of Injuries by Place of Occurrence & Sex
between 01-01-2006 and 31-12-2006 in All



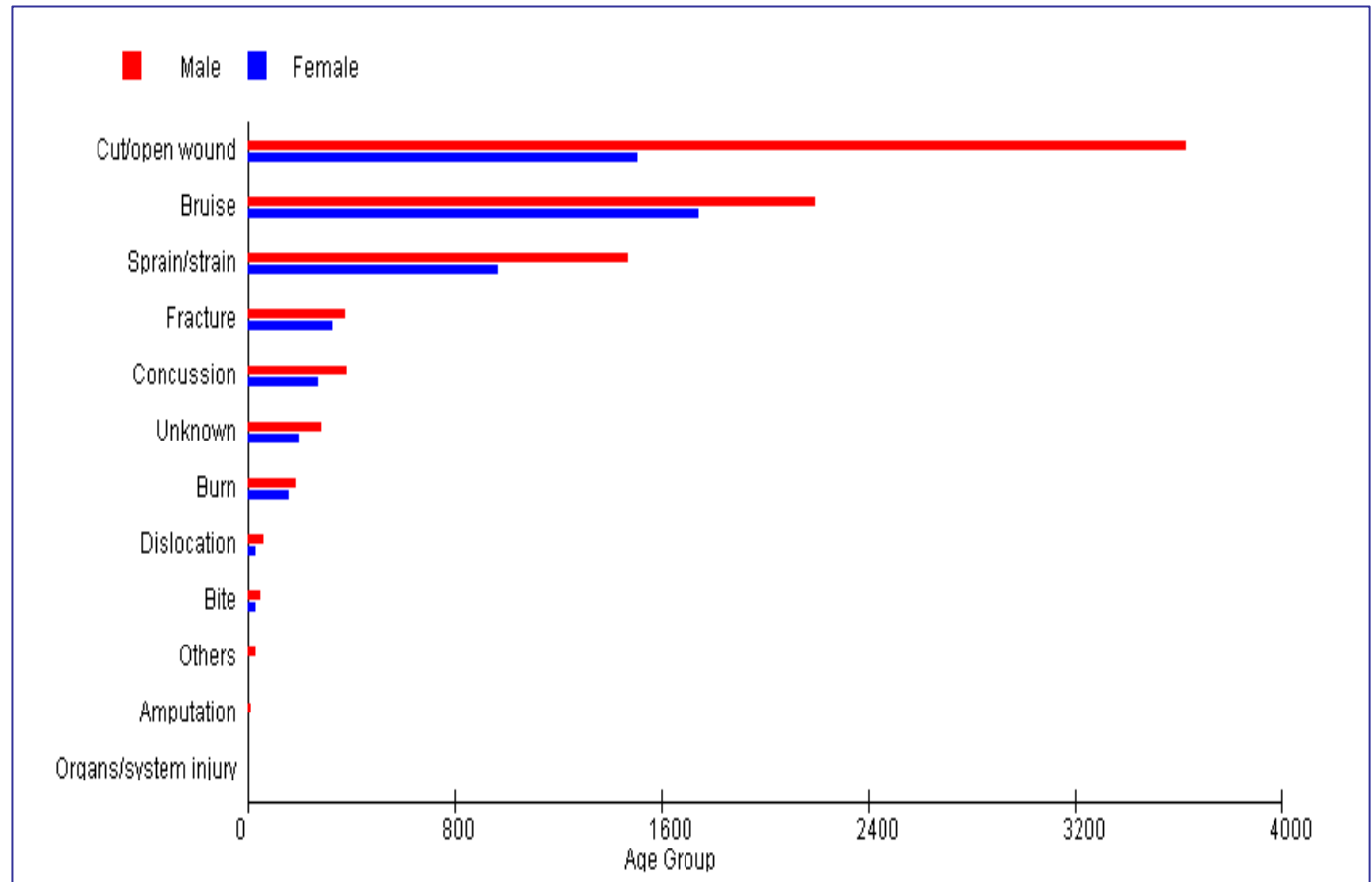
Top leading activities when injured were:

1. Traveling(42.55%)
2. Work(38.65%)
3. Sport(9.37%)
4. Unknown(5.51%)
5. Others(2.10%)
6. Education(1.82%)

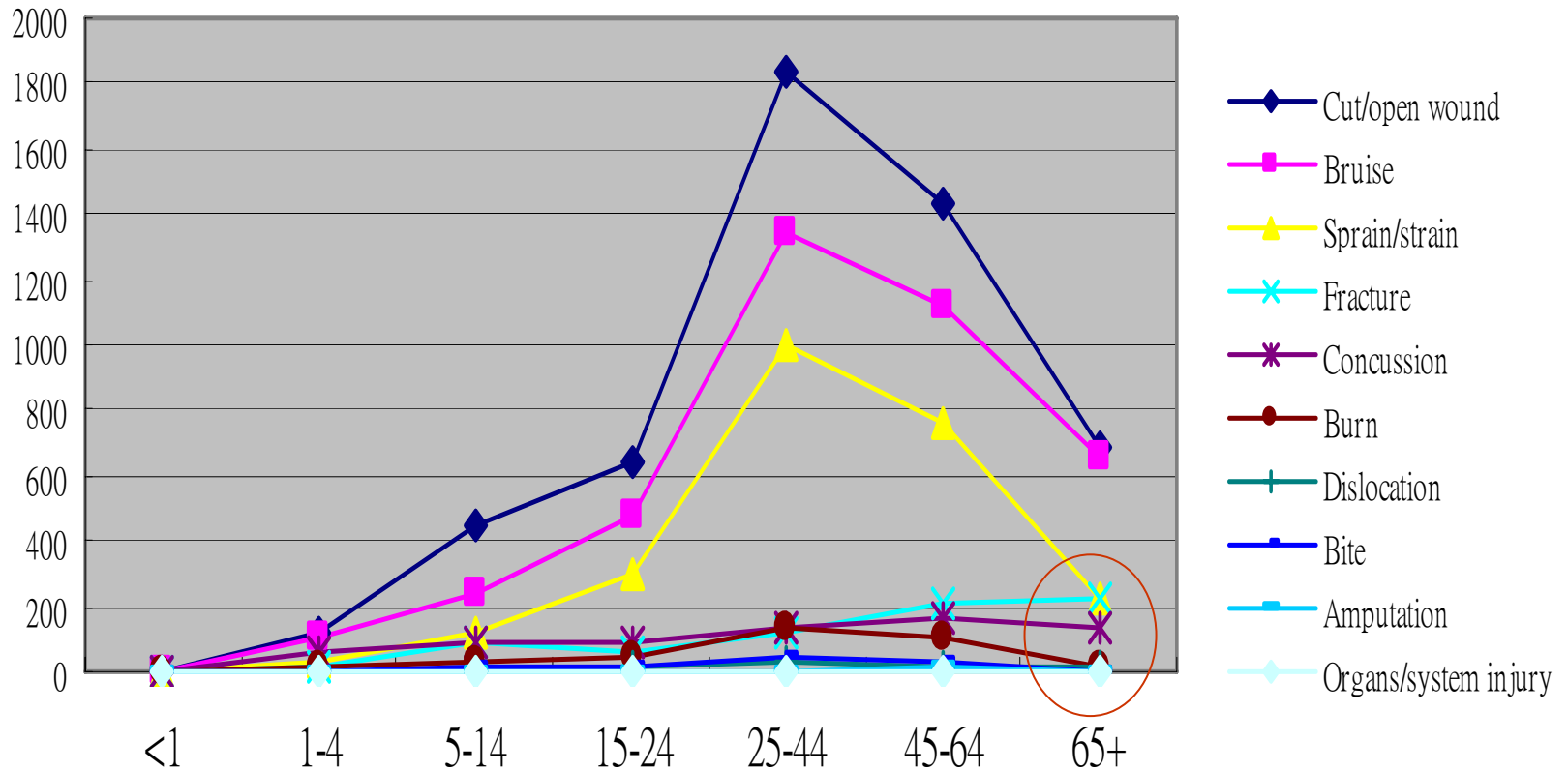


Top ten leading types of injury

1. Cut/open wound(36.78%)
2. Bruise(28.19%)
3. Sprain/strain(17.48%)
4. Fracture(5.05%)
5. Concussion(4.71%)
6. Unknown(3.50%)
7. Burn(2.51%)
8. Dislocation(0.69%)
9. Bite(0.64%)
10. Others(0.26%)

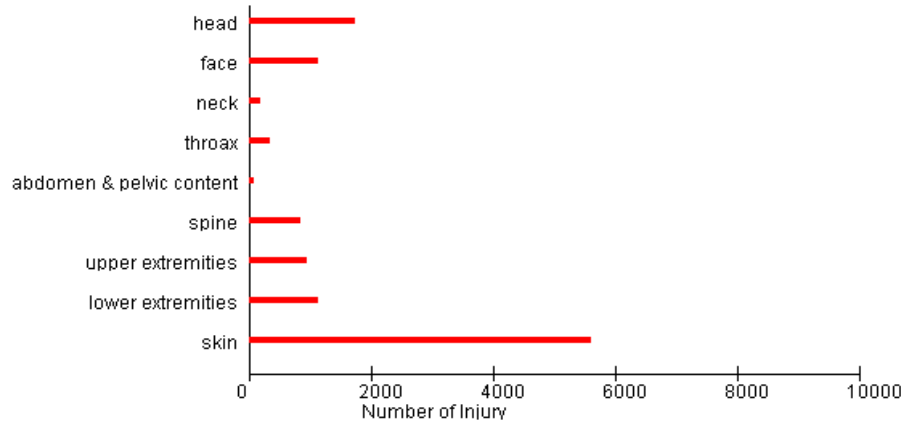


Age distribution of injury type



Number of Injury by Region

Number of Injury by Region
between 01-01-2006 and 31-12-2006 in All



Number of Injury by Region between 01-01-2006 and 31-12-2006 in All

Body Region	Total
head	1750
face	1153
neck	186
throat	365
abdomen & pelvic content	99
spine	852
upper extremities	959
lower extremities	1143
skin	5627

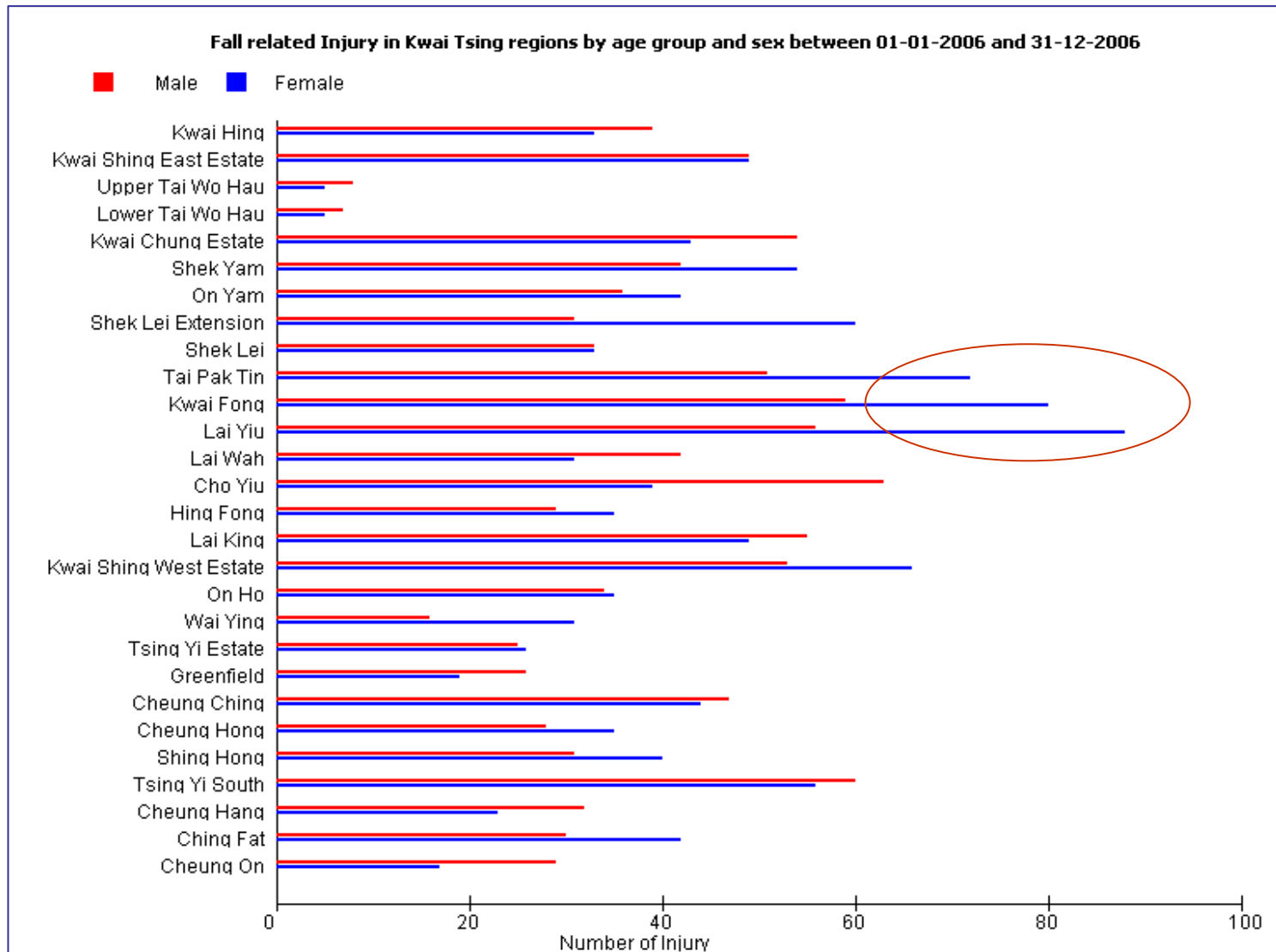
Right Click [Here](#) and Choose Save as to save the case list file.

Body Region by Activity

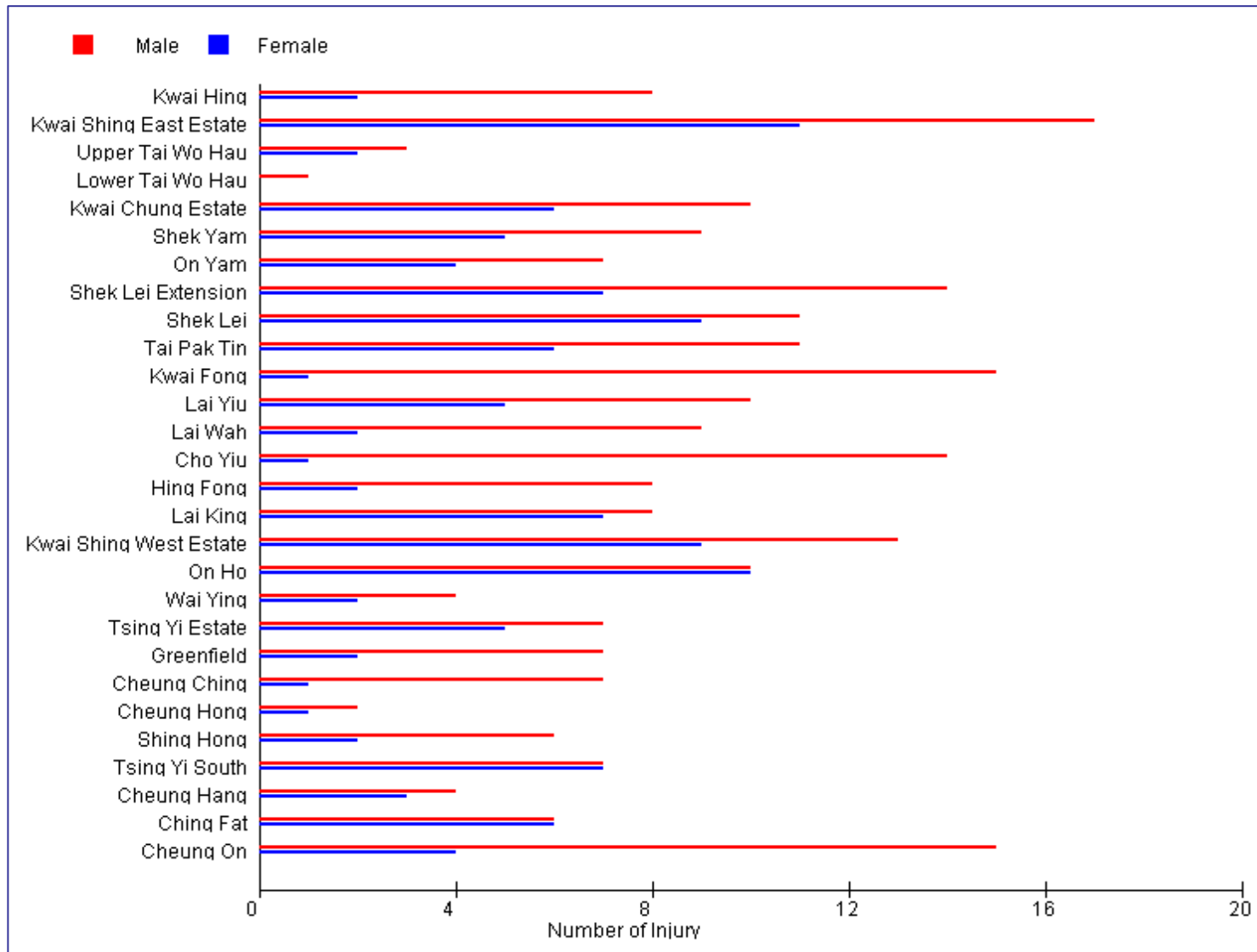
Body Region (0 - 80) between 01-01-2006 and 31-12-2006 in All

Activity when Injured	Body Region								
	head	face	neck	throat	abdomen & pelvic content	spine	upper extremities	lower extremities	skin
Others	2.63%	2.08%	1.61%	2.74%	3.03%	1.41%	0.94%	1.31%	1.28%
Unknown	6.97%	4.77%	6.99%	4.93%	5.05%	2.82%	3.65%	3.32%	3.18%
Work	24.34%	23.94%	31.18%	30.96%	26.26%	54.81%	34.10%	30.01%	36.80%
Education	3.09%	2.52%	1.08%	0.27%	3.03%	0.59%	2.19%	0.96%	1.19%
Sport	7.94%	11.45%	5.91%	5.21%	5.05%	4.11%	18.87%	20.30%	4.87%
Traveling	53.71%	51.00%	53.23%	54.52%	57.58%	31.46%	34.20%	38.06%	29.31%

Injury Chart – Fall injury



Injury Chart – Interpersonal Violence



Risk factors identified by incident

Place of occurrence	Highway/ Street 17.4%	Home 11.8%	Factory/ Workshop 6.7%	Office/ Company 3.18%	Construction site 2.31%	Playground 2.34%	School 2.34%
Activity	Traveling 24%	Work 21.8*	Sport 5.3%	Education 1.02%			
Cause of injury	Other blunt force 20.5%	Fall 21.8%	Stab/Cut 6.02%	Traffic injury 3.69%	Fire/Heat 1.1%	Lifting 0.75%	
Age groups	>65 15.24%	25-34 15.02%	45-54 16.97%				
Injury by Site	Skin 1.17%	Head 10.96%	Lower limbs 14.76%	Face 5.76%	Upper limbs 14.56%		

Injury Map

Injury Map Report

Traffic Injury

Fire-related injury

Drowning

Suicide

Fall related injury

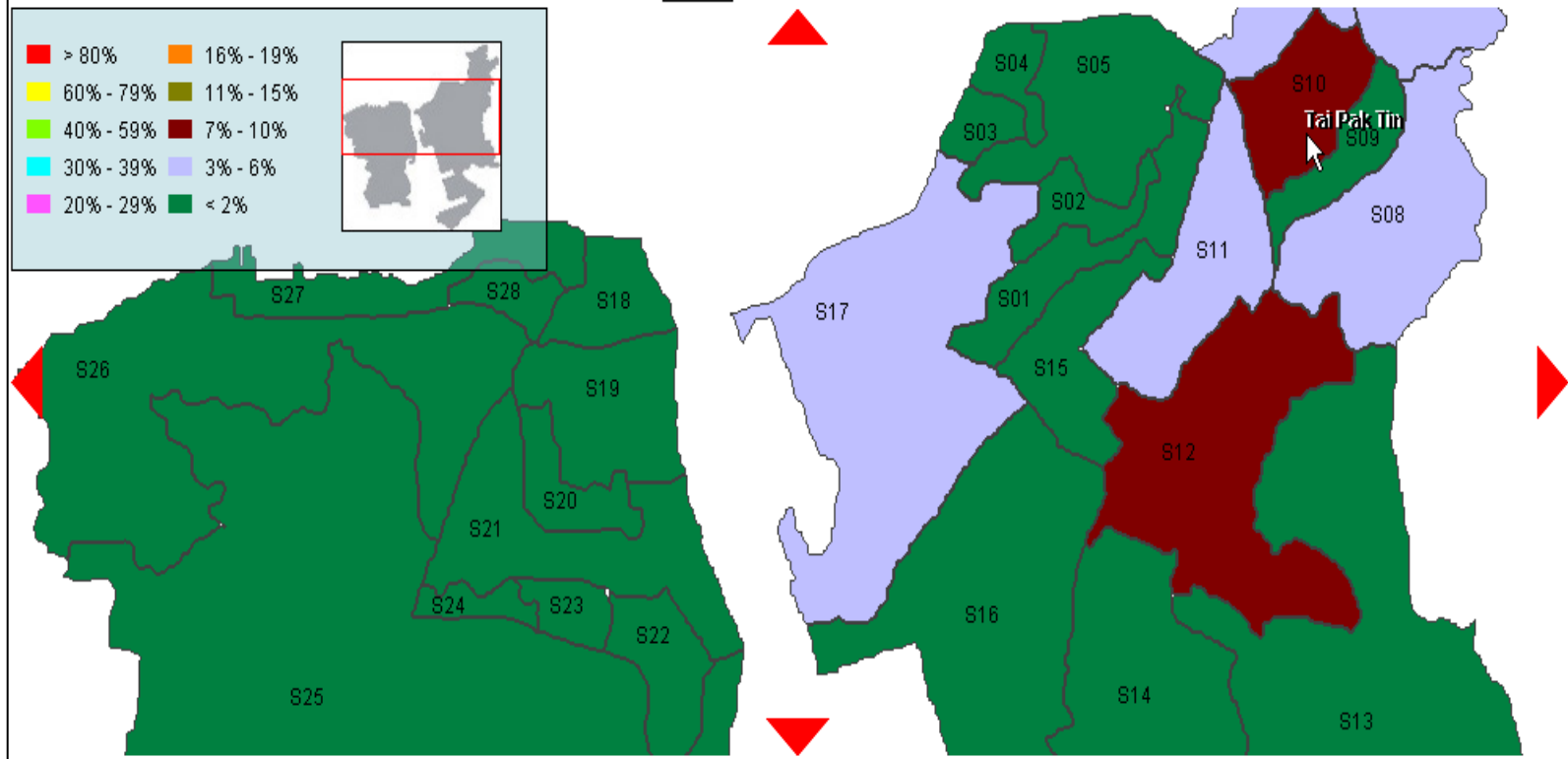
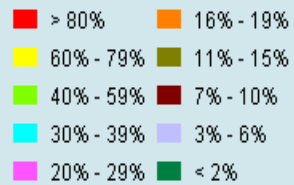
Interpersonal Violence

Optional

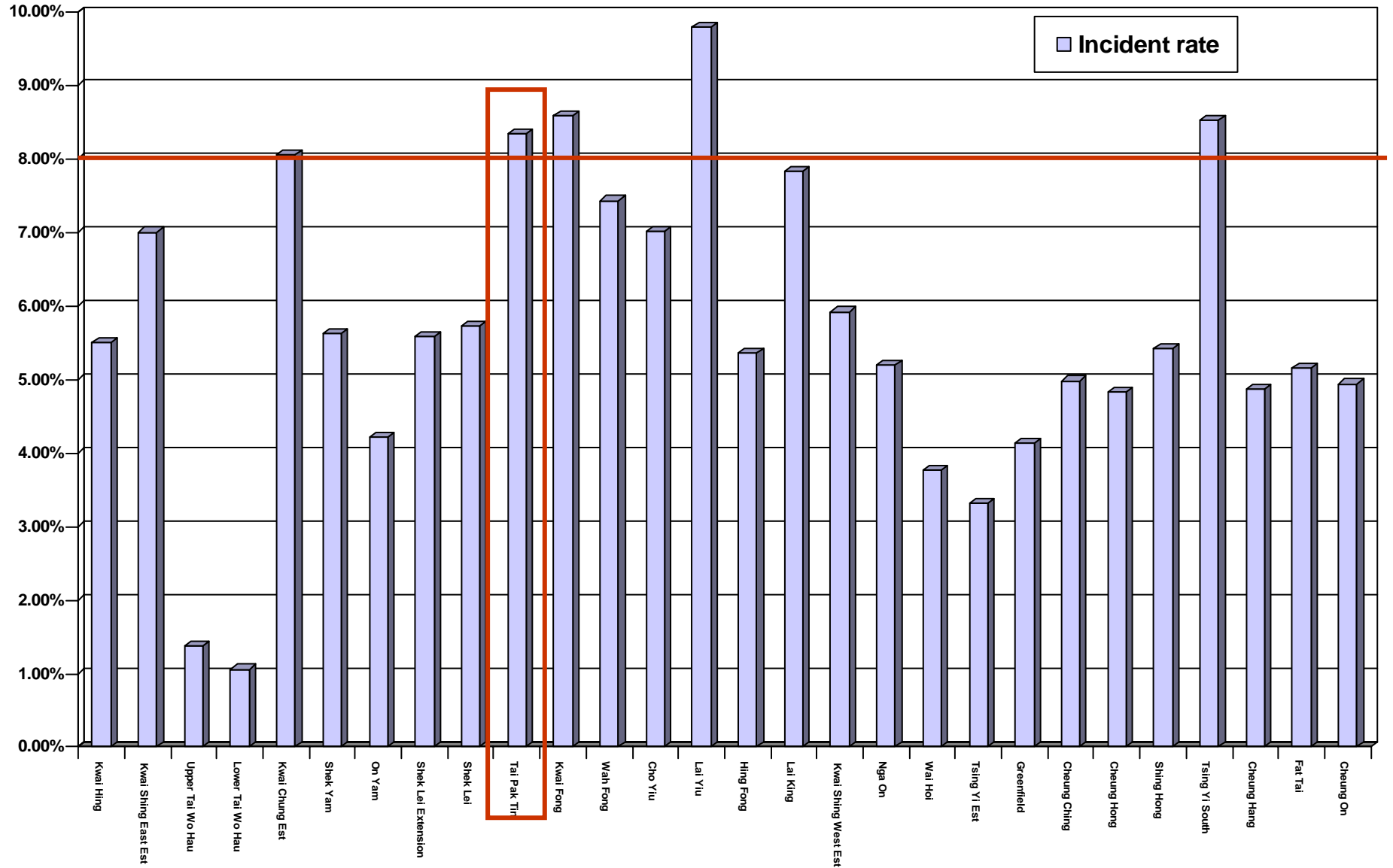
Fall related Injury

Age Range :

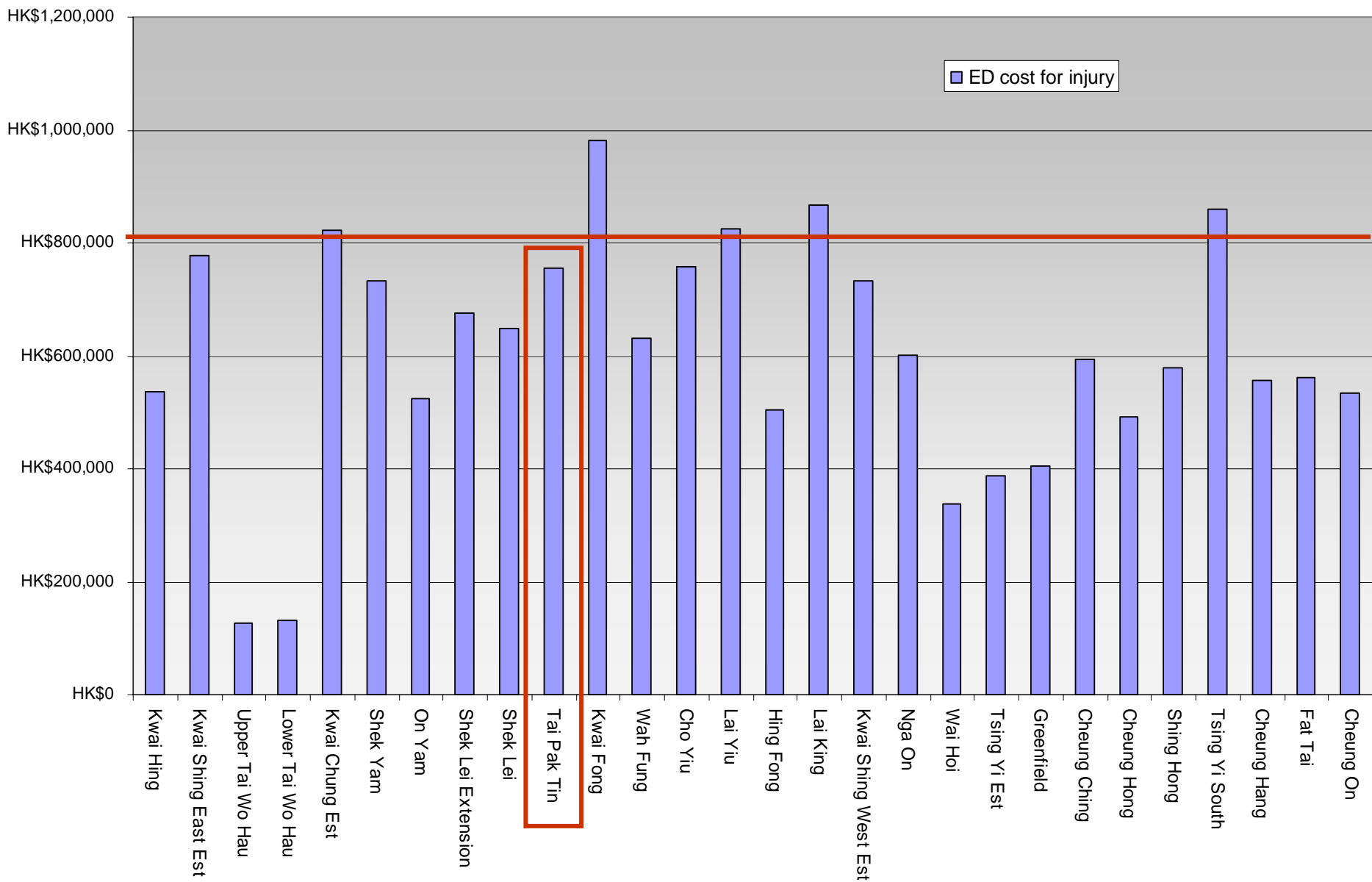
Gender :



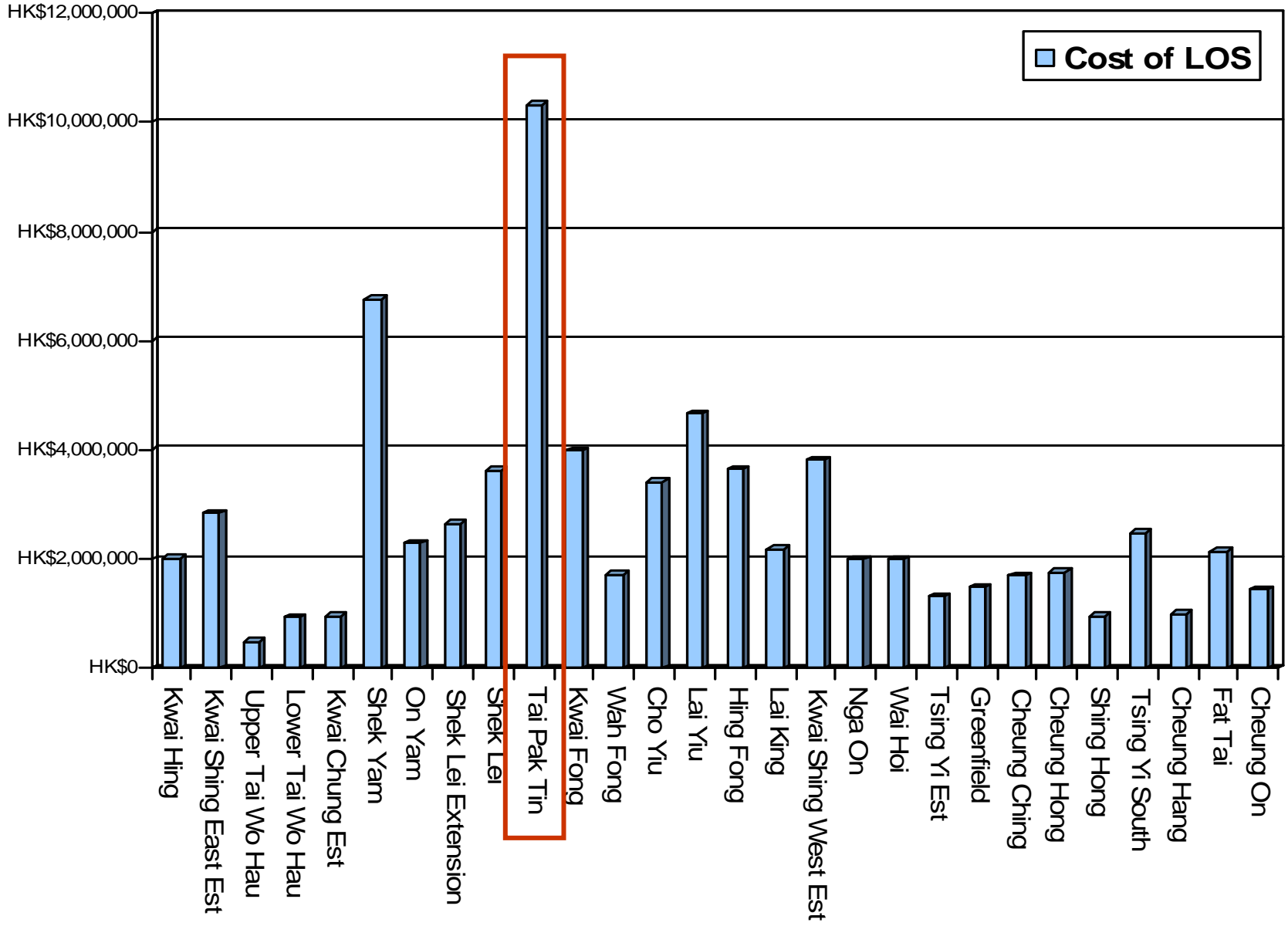
Incident Rate



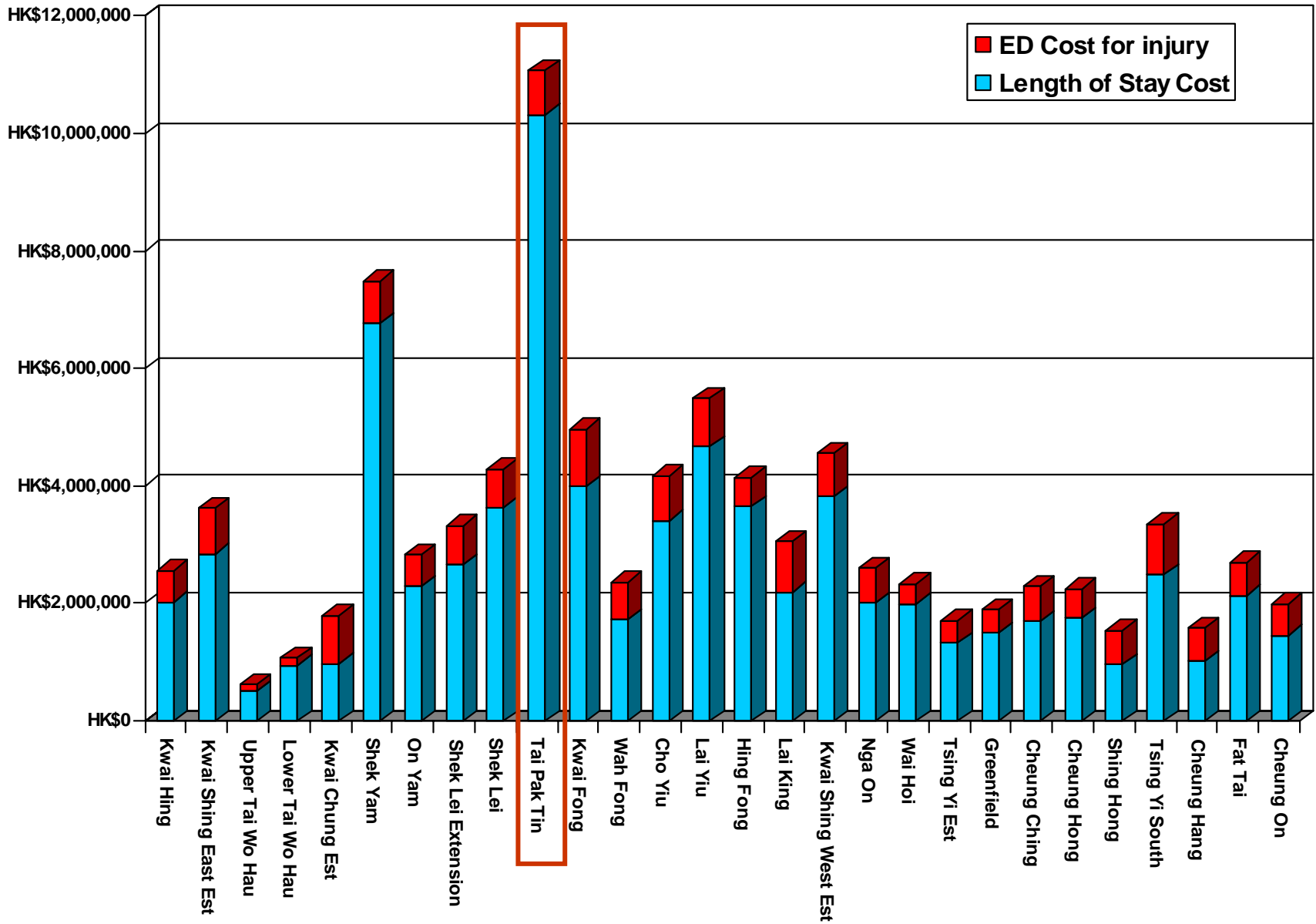
ED cost for injury



Hospital Length of Stay Cost



Total Direct Medical Cost of Injury



Fall Prevalence – Kwai Tsing

- Total injury attendance **30,000**
- Total Fall cases **2217** (21% of all captured cases)
- Male : Female (4.8 : 5.2)
- Overall Incident rate for fall is **4.2 in 1000 people per year**
- **20% required admission**
- Top 3 areas for fall :
 1. Lai Yiu
 2. Tai Pak Tin
 3. Kwai Shing West Est.

Kwai Hing	72	3.25%	4.2
Kwai Shing East Est	98	4.42%	5
Upper Tai Wo Hau	13	0.59%	0.8
Lower Tai Wo Hau	12	0.54%	0.5
Kwai Chung Est	97	4.38%	5.4
Shek Yam	96	4.33%	4.2
On Yam	78	3.52%	3.6
Shek Lei Extension	91	4.10%	4.3
Shek Lei	66	2.98%	3.3
Tai Pak Tin	123	5.55%	7.7
Kwai Fong	139	6.27%	6.9
Lai Wah	73	3.29%	4.9
Cho Yiu	102	4.60%	5.4
Lai Yiu	144	6.50%	9.7
Hing Fong	64	2.89%	3.9
Lai King	104	4.69%	5.3
Kwai Shing West Est	119	5.37%	5.5
On Ho	69	3.11%	3.4
Wai Ying	47	2.12%	3
Tsing Yi Est	51	2.30%	2.5
Greenfield	45	2.03%	2.6
Cheung Ching	91	4.10%	4.4
Cheung Hong	63	2.84%	3.5
Shing Hong	71	3.20%	3.8
Tsing Yi South	116	5.23%	6.6
Cheung Hang	55	2.48%	2.7
Cheung Fat	72	3.25%	3.8
Cheung On	46	2.07%	2.4

Injuries in Tai Pak Tin

- **Number of samples** : **404**
- **Gender** : **M:F= 201 : 203**
- **Age** : Range 3 yrs old to 102 yrs
Standard deviation :28.53 yrs
Mean age: **59.81 yrs**
- **Medical history (52%, n = 210)**
 - CVA = 60
 - Dementia = 25
 - DM = 24
 - HT = 19
 - Psychiatric = 8
 - Asthma = 8

Majority of the victims are elderly , half of them with pre-existing medical problem like CVA and Dementia

Falls in Tai Pak Tin (n=160)

No. of **repeated episodes** (n=99, 25%)

42 cases with repeated injury (38 cases lived in OAH)

26 cases with repeated injury for 2 x

14 cases with repeated injury for 3 x

2 cases with repeated injury for 4 x

1 case with repeated injury for 5 x

30 cases with **medical history** (neuro = 9, CVS = 6, CVA = 5)

No. of live alone = 3

*There were 42 cases identified with **repeated injuries**, they responsible for 99 episode, 25% of all the injury cases . Majority of the event **occurred in OAH***

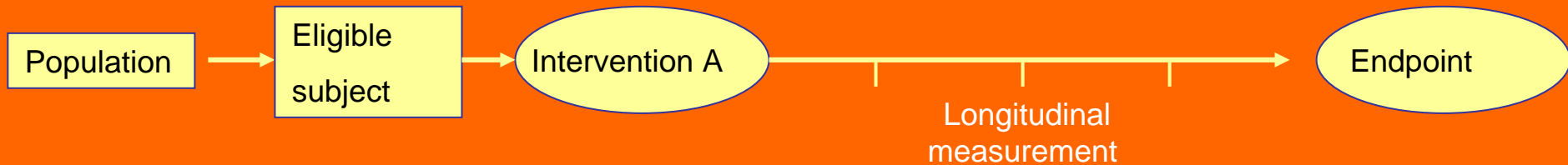
Environmental analysis – RCHE

OAH	No. of case	Fell	Fell in toilet	Fell from Bed	Fell from Chair	Fell from wheelchair	Other Blunt force	Street	Restaurant	Cut	Collapsed	Unknown
OAH1	4	0	2	0	1	0	1	0	0	0	0	0
OAH2	1	1	0	0	0	0	0	0	0	0	0	0
OAH3	8	4	0	0	2	1	0	0	0	0	0	1
OAH4	1	1	0	0	0	0	0	0	0	0	0	0
OAH5	7	3	0	2	1	0	0	1	0	0	0	0
OAH6	12	4	2	3	0	0	2	0	0	0	0	1
OAH7	18	5	3	4	2	1	1	0	0	1	1	0
OAH8	5	3	0	0	0	0	1	1	0	0	0	0
OAH9	21	7	2	9	0	0	0	1	1	0	0	1
OAH10	6	2	3	0	0	0	0	0	0	0	0	1
OAH11	3	1	1	1	0	0	0	0	0	0	0	0
OAH12	1	0	0	1	0	0	0	0	0	0	0	0
OAH13	11	5	3	1	1	0	0	0	0	0	0	1
OAH14	53	23	4	9	1	2	5	3	0	1	2	3
OAH15	6	1	2	2	0	0	1	0	0	0	0	0
OAH16	13	5	5	1	1	0	0	0	0	0	1	0
Total	170	65	27	33	9	4	11	6	1	2	4	8

Identified problems

- Elderly fall injury in OAH (**n=170**)
- Repeat elderly fall cases (**n=43, 99 episode**)
- Special measure/management to the toilets for elderly (**n=30, 27 in OAH**)
- Outdoor injury : **n=35** (exact location could not be identified at the moment)
- High risk group with special medical history like CVA, HT and dementia

Pilot of injury reporting and prevention in RCHE



Collaboration with SWD for community base injury prevention program

- Task group formation with domain knowledge input and support from government agency
- To design and implement **on-site assessment**
- To **design targeted interventions** with reference to aggregated data from ED surveillance and on-site assessment
- To **implement the planned action with agreed time frame**
- Two months counted from the start of intervention (two months intervals)

2nd version

Development of 2nd version injury surveillance

**A New System with
Geographical Information System**

GIS

supported by KT DC

In progress



New interface design

Multi-centered
Injury
surveillance
system





GIS for injury event

Injury Surveillance System

General Injury Confirmation Data Definition AE No. AE123456486

Injuries Identified

- Crushing injury of thumb and other finger(s)
- Combined traumatic amputation of (part of) finger(s) with other parts of wrist and
- Traumatic amputation of other single finger (complete)(partial)
- Traumatic amputation of two or more fingers alone (complete)(partial)
- Traumatic amputation of thumb (complete)(partial)
- undefined
- Open wound of finger(s) without damage to nail
- Contusion of finger(s) with damage to nail
- undefined
- Multiple Part
- Other Part
- Unspecified Part
- Superficial injury of wrist and hand, unspecified
- Open wound of wrist and hand part, part unspecified
- Traumatic amputation of wrist and hand, level unspecified
- Unspecified injury of wrist and hand

CLEAR SEND

Next Cancel

2D body map for ICD 10 injury coding

Injury Surveillance System

General Injury Confirmation Data Definition AE No. AE123456486

Injuries Identified

- Dislocation of finger
- Sprain and strain of finger(s)
- undefined
- Fracture of other finger
- Traumatic rupture of ligament of finger at metacarpophalangeal and interphalangeal
- Fracture of first metacarpal bone
- Fracture of other metacarpal bone
- Multiple Part
- Other Part
- Unspecified Part
- Fracture of other and unspecified parts of wrist and hand
- Sprain and strain of other and unspecified parts of hand

CLEAR SEND

Next Cancel



Injury Surveillance System

General

Injury

Confirmation

Data Definition

AE No. **AE123456486**

Confirmation

Press the Save button to save the data.

Edit

Place: Highway/Street
Activity: Traveling Private
Intent: Intentional (A/A)
• **For (A/A) Context:** Gang activity
• **For (A/A) Relationship:** Classmates/schoolmates
Mechanism: Trap
Alcohol: Yes
Drug: Yes

Save

Cancel

Edit

Nature of Injury	Injury by Site
D/S/S	Sprain and strain of other and unspecified parts of hand
Fracture	Fracture of other and unspecified parts of wrist and hand
	Multiple fractures of metacarpal bones



Projection +east,+north(m)

800143.63, 841340.02

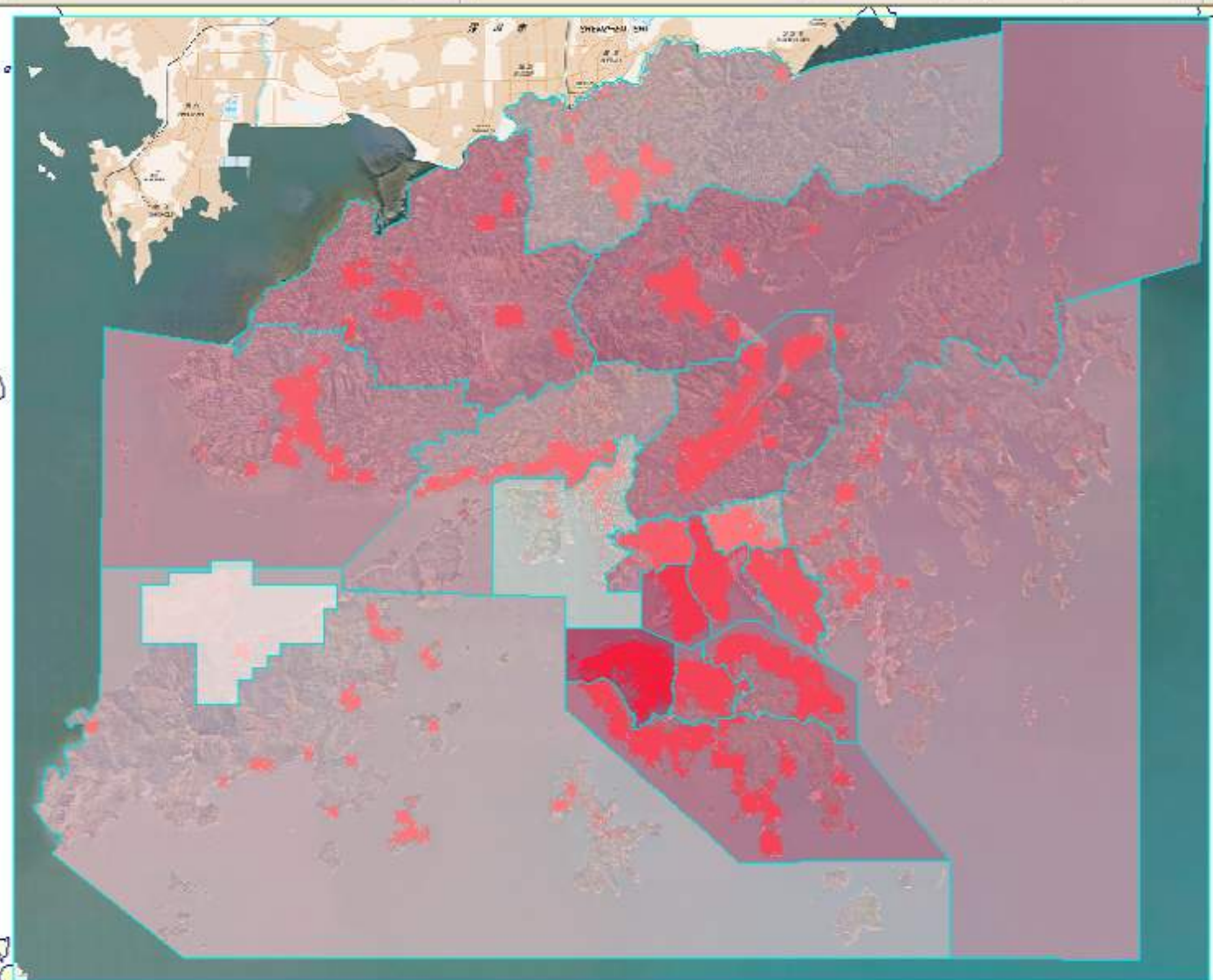
No Active Filter

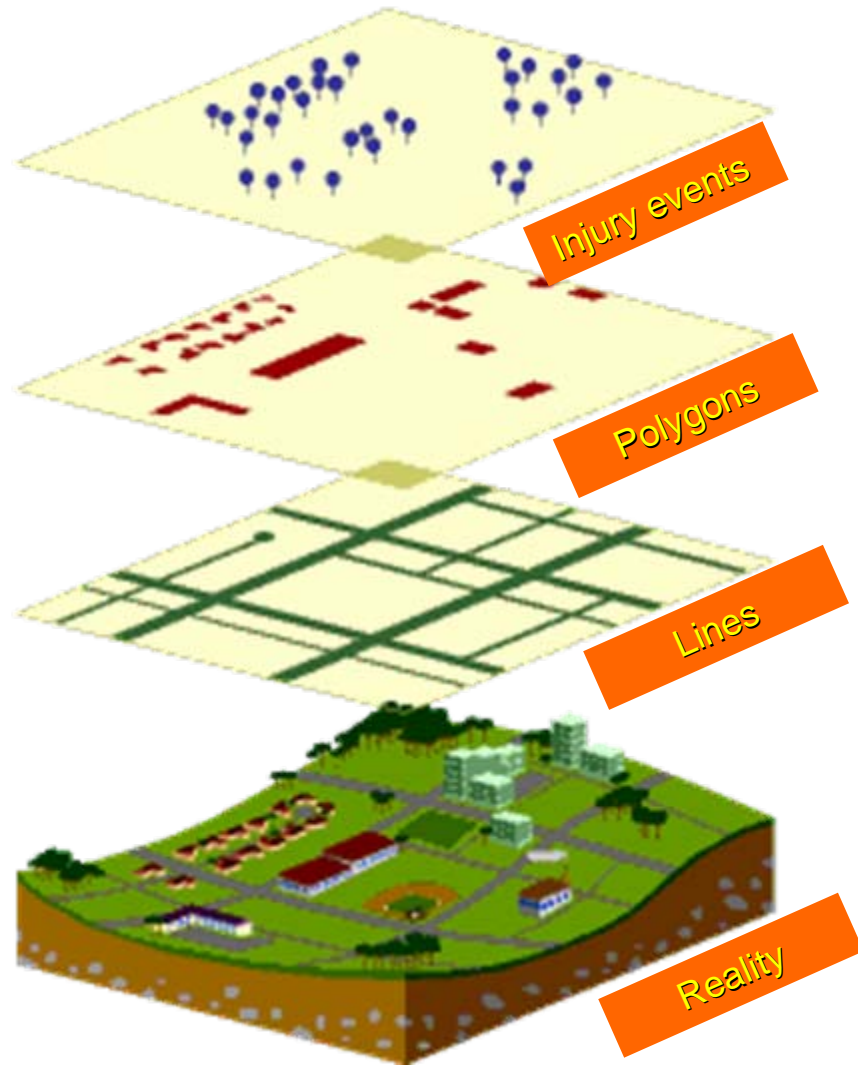


Legend panel containing the following items:

- Aggregation of dist...
- build_point (17738)
- dist_18 (19)
- DOP5K2003052.ecw**
- s_outline (147)

At the bottom of the legend panel are controls for "Display Order" and "Groups".





Correlation studies. digitalized geo-coding of injury events

Spatial analysis by maps tools.

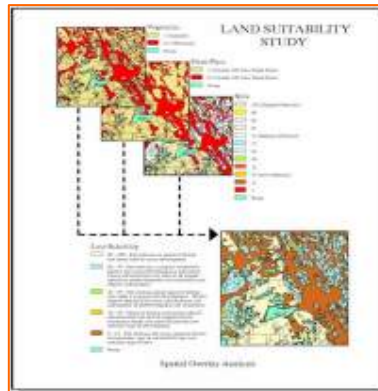
Clustering and evaluate the relationship to the location of polygons/facilities.

Inferential statistics will be employed to identify the identification of **clusters of excess or clustered of deficit** given by road casualty weighted road density exposure.

Buffer analysis



Map overlay



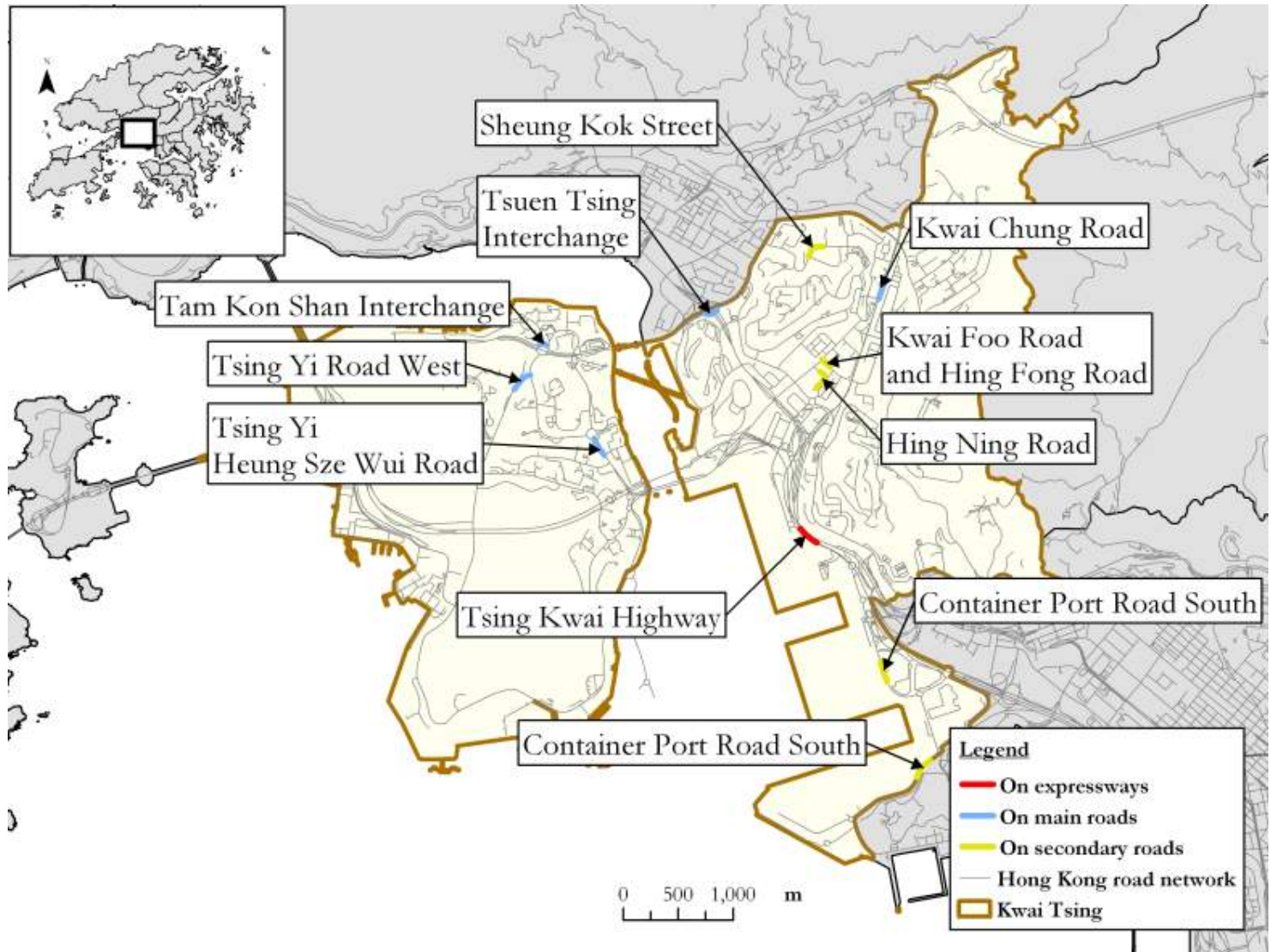
Proximities analysis



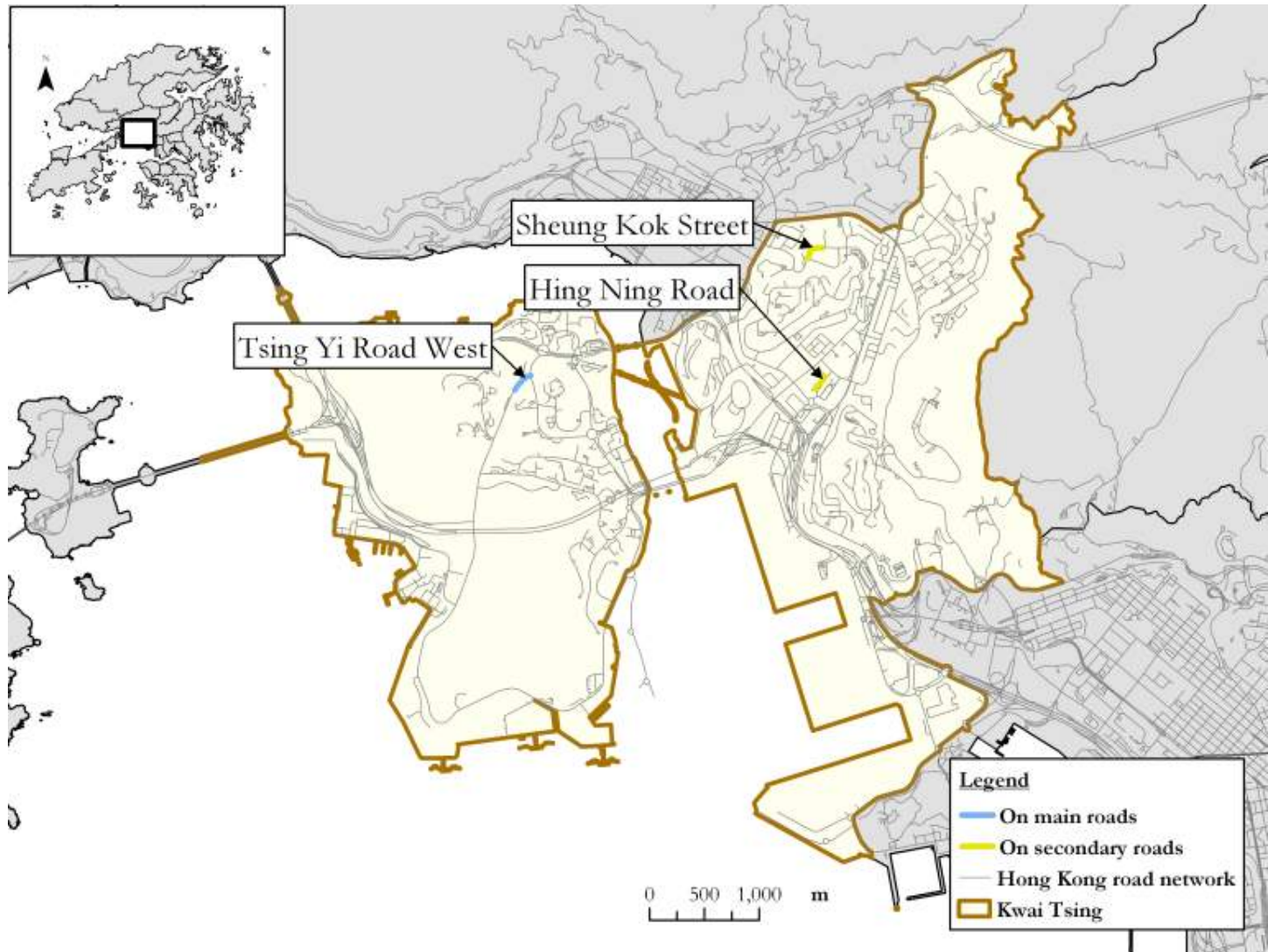
Network analysis



Hot zones for 6 crashes or more in Kwai Tsing District in 2006



26 Hot zones for 8 crashes or more in Kwai Tsing District in 2006











柏齡醫院
Hoi Yee Hospital





Step forward - 2:

Target injury prevention program

Step forward - 3:

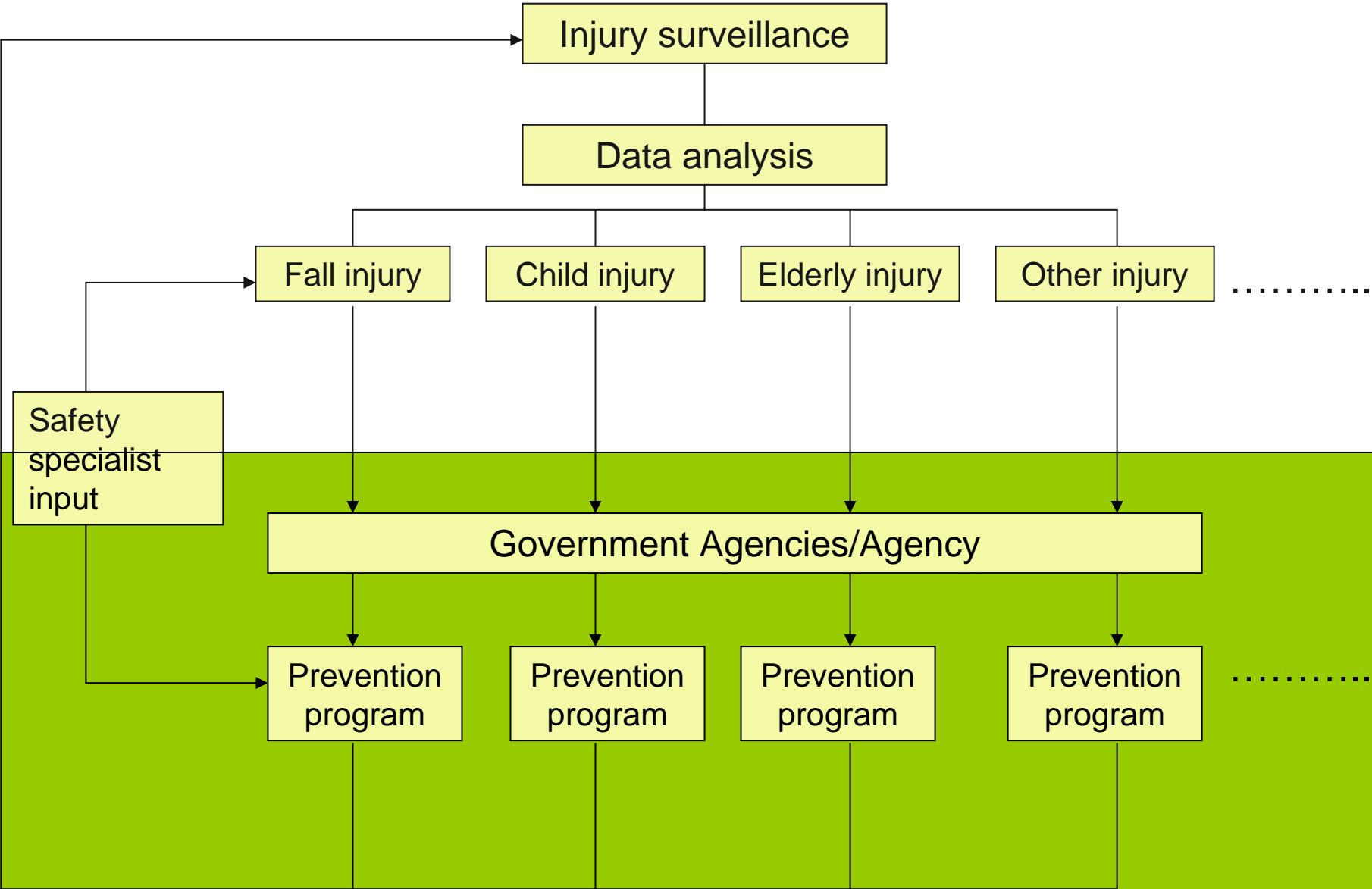
Establish

Injury prevention and
Safety Promotion Centre

Injury Prevention and Safety Promotion center

- Established in Dec 2007
- Located in the CHRC, Princess Margaret Hospital
- Injury surveillance and programming
- Coordinate and manage various Prevention programs
- Research and Statistics
- Report distribution
- Liaison with government agencies

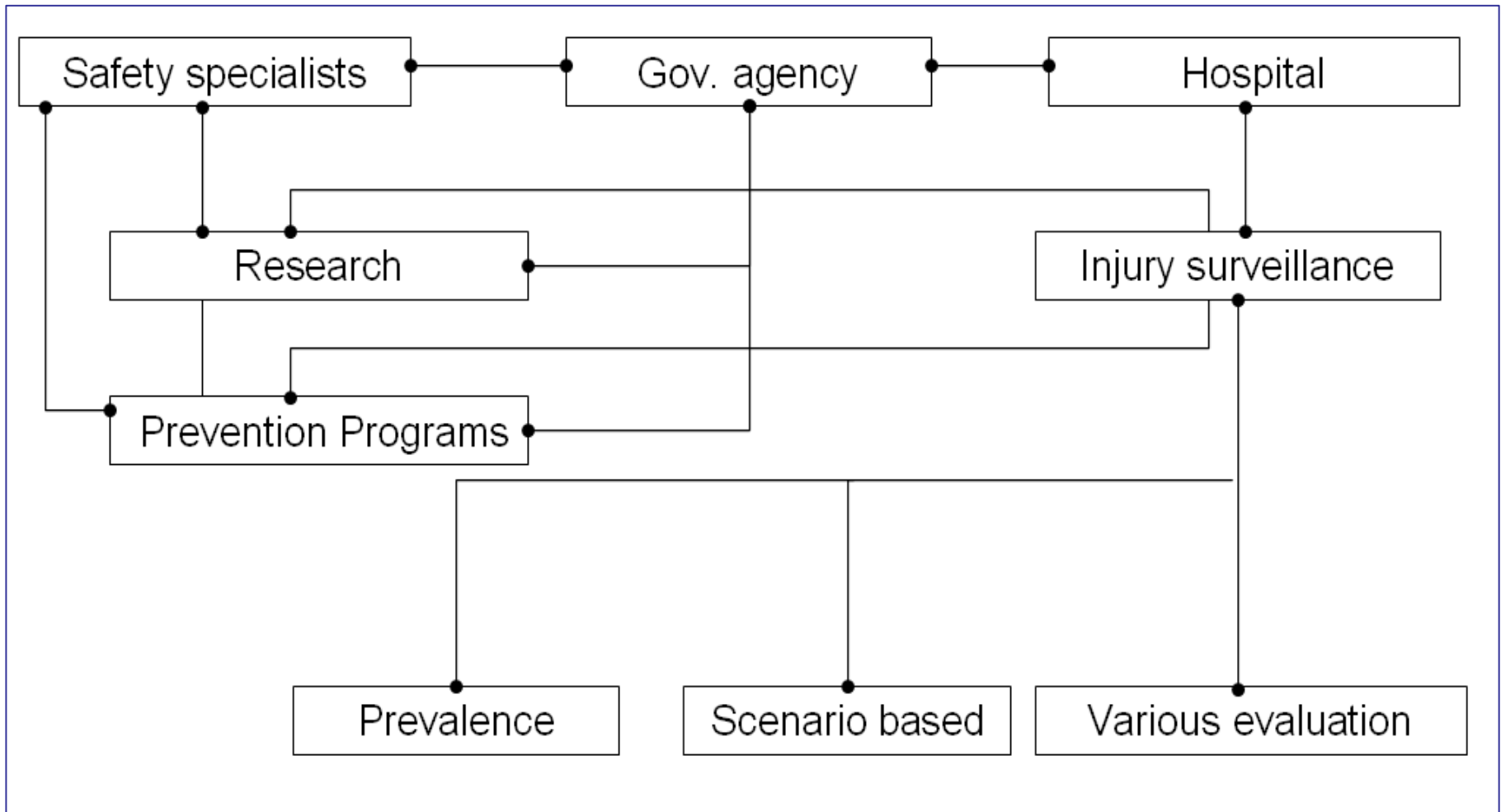
Proposed strategic model of targeted injury prevention and control



Collaboration mechanism of injury

prevention and control (Kwai Tsing) – illustrated by

objected oriented model



Conclusion

- Injury is an serious health problem; because of its impact on health; including **premature death**, **disabilities** and the **burden on our health care system**

CDC's Injury Center

- **Safe community** is an proved model for injury prevention

WHO Collaboting Centers on Safey Promotion and Injury Prevention, Conceptual and Operational Aspects. Quebec 1998.

- The first core task of health sector recommended by WHO would be a **surveillance system** ,

Regional Framework for Action on Injury and Violence Prevention 2006-2010 (by WHO, Western Pacific Regional Office)

- **Injury prevention and safety promotion center** help *prevention and control of injuries.*

Safe Community is
Cost Effectiveness
&
High Cost Benefit Ratio

Thank you

葵青安全社區

全力推薦

葵青 KWAI TSING
健康 · 安全
Healthy · Safe

致力培育安全文化
為葵青區居民建立一個安全健康的生活及工作環境

葵青安全社區籌導委員會成員

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The poster features a collage of images showing community events, a lion dance, and a group of people in red and white uniforms. It lists various partner organizations and their logos at the bottom.