Risk assessment of HIV transmission in health care settings

Dr Owen Tsang
Princess Margaret Hospital
24 April 2012

The incident

A health care work committed Suicide and was firmed to be HIV positive in January 2012

Some ripples

Ripple 1: cover up?

衞署遮遮掩掩

隱瞞絕症禍香江 庸官亂喻當秘笈

昨始發內部通告叫同事驗身

醫局被轟隱瞞圖淡化事件

Ripple 2: risk of transmission

周一嶽：「醫傳病」風險不高

善後清潔工 人心惶惶

外科手術增感染風險

全球一宗醫生感染病人

全球4宗個案
愛滋醫護傳染9病人

Ripple 3: Should we look back for possible cases

衞署籲快速測試140病人

須速尋手術病人驗血

Ripple 4: should HIV HCW report their illnesses, balance between confidentiality & privacy

呈報機制一塌糊塗

Call for doctors to declare HIV status exaggerates risk of disease transmission

呈報機制崩潰
乙肝照做手術

醫局無意改變通報制度

Ripple 5: discrimination vs HIV patients

抹黑香港通街係帶菌者

愛滋病團體接求助增5成

Issues for discussion

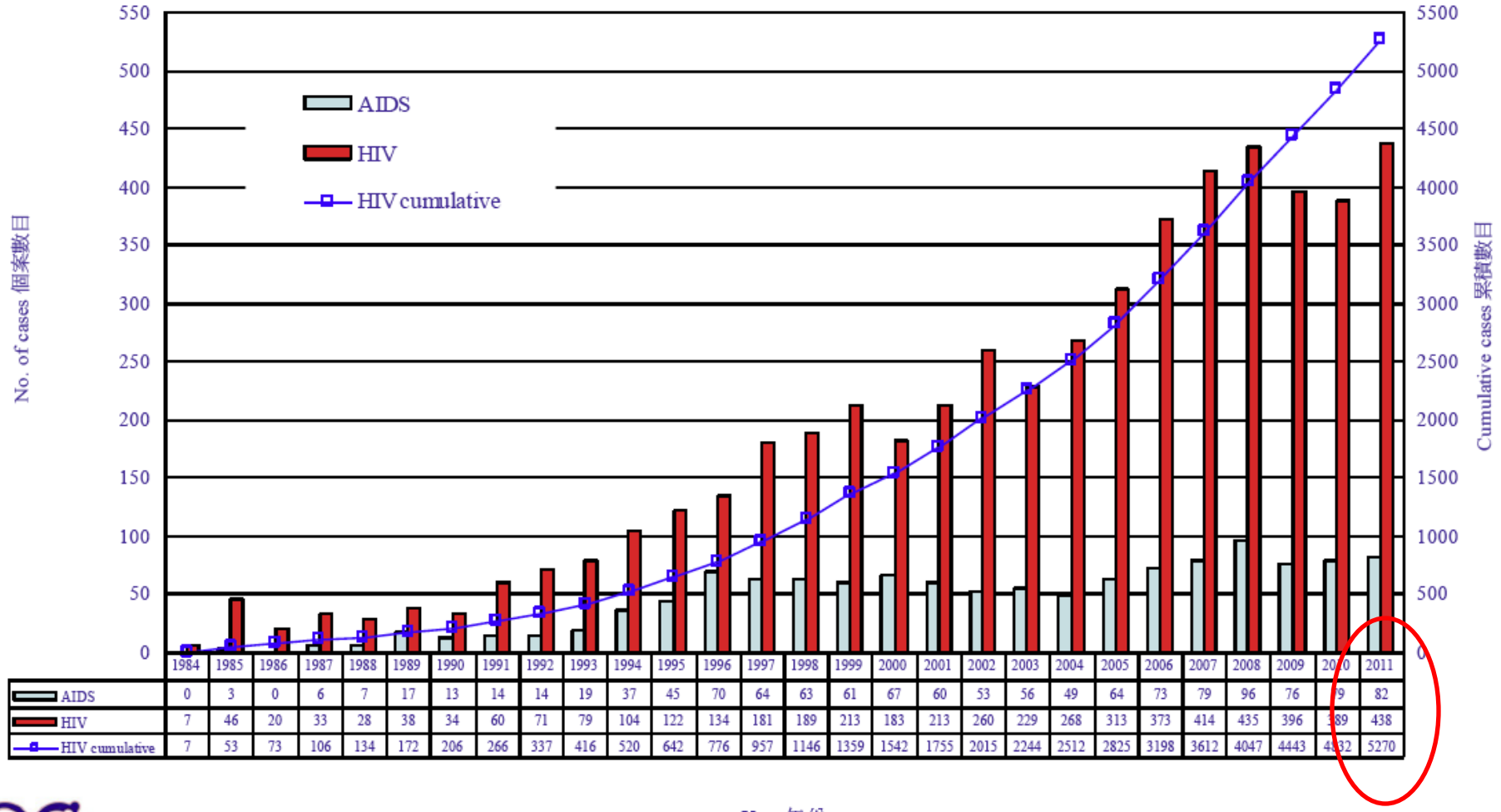
- HIV situation in HK
- Transmission risk from Health care worker to patients
- Exposure prone procedures (EPP)
- Overseas experience
- Duties of HCW

Situation of HIV in Hong Kong

	This Quarter (Oct to Dec 2011)		Cumulative	
	HIV	AIDS	HIV	AIDS
1. Sex				
Male	96	23	4201	1072
Female	25	3	1069	195
2. Ethnicity				
Chinese	76	20	3491	980
Non-Chinese	45	6	1779	287
3. Route of Transmission				
Heterosexual contacts	27	8	2237	748
Homosexual contacts	51	11	1461	286
Bisexual contacts	3	2	217	52
Injecting drug use	5	1	310	53
Blood / blood product recipients	0	0	81	24
Perinatal	0	0	26	8
Undetermined	35	4	938	96
4. Total	**121**	**26**	**5270**	**1267**

CHP data 2012

Annual HIV/AIDS Statistics
香港每年愛滋病病毒感染及愛滋病統計
1984 – 2011, Hong Kong (N=5270/1267)



	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
AIDS	0	3	0	6	7	17	13	14	14	19	37	45	70	64	63	61	67	60	53	56	49	64	73	79	96	76	79	82
HIV	7	46	20	33	28	38	34	60	71	79	104	122	134	181	189	213	183	213	260	229	268	313	373	414	435	396	389	438
HIV cumulative	7	53	73	106	134	172	206	266	337	416	520	642	776	957	1146	1359	1542	1755	2015	2244	2512	2825	3198	3612	4047	4443	4832	5270

要有一盒
Safer Sex

Data from ITC

Possible HIV HCW in HA

- HK population by 2011: 7.07 M
- HIV population by 2011: 5270
- Prevalence: **0.07%**
- No of HA staff by 2010: 57,713
- Possible HIV infected staff: 57,713 x 0.07% = **43** HCWs

What is the risk of transmission

For needle stick injury

- Risk of transmission from **patients to HCW**:
  - Hepatitis B: 30%
  - Hepatitis C: 3%
  - HIV: 0.3%
  - Many documented reports
- **Mechanism is different from that of transmission from HCW to patients**

Used needle:
higher volume of pathogen

Risk of transmission
is higher

Whenever needle stick injury occurs,
the patient care procedure will usually be stopped.
In general, the volume of pathogen will be low.
The risk of transmission is relatively low.

However, what would be the risk?

Exposure prone procedures (UK)

- Invasive procedures where there is a risk that injury to the worker may result in the **exposure** of the **patient's open tissues** to the **blood of the worker** (**bleed-back**).
- These include procedures where the worker's gloved hands may be in contact with sharp instruments, needle tips or sharp tissues (eg spicules of bone or teeth) inside a patient's open body cavity, wound or confined anatomical space where the **hands or fingertips may not be completely visible at all times**.

Exposure prone procedures

- **UK**
  - **Category 1:**
    - Hands and fingertips of the worker are **usually visible** and **outside** the body most of the time
    - local anaesthetic injection in dentistry, removal of haemorrhoids
  - **Category 2:**
    - Fingertips may **not** be **visible at all times** but **injury** to the worker's gloved hands from sharp instruments and/or tissues is **unlikely**
    - routine tooth extraction, appendicectomy
  - **Category 3:**
    - Fingertips are **out of sight** for a significant part of the procedure, there is a **distinct risk of injury** to the worker's gloved hands from sharp instruments and/or tissues
    - hysterectomy, caesarean section, open cardiac surgical procedures

- **US**
  - **Category 1:**
    - **Minimal risk**
    - Routine rectal or vaginal examination, Minor surface suturing
  - **Category 2:**
    - **Theoretically** risk but unlikely
    - Locally anesthetized operative, prosthetic, and endodontic dental procedures, Subcutaneous pacemaker implantation
  - **Category 3:**
    - **Definite** risk or that have been classified previously as "**exposure-prone**"
    - nephrectomy, small bowel resection, cholecystectomy, Cardiothoracic OT, Obstetrical/gynecological OT

Herderson DK, et al. ICHE 2010;31(3): 203-232
Management of HIV-infected Healthcare Workers. The Report of the Tripartite Working Group. April 2011, Department of Health.

Reported cases of transmission from HCW to patients around the world

CDC Home | Search | Health Topics A-Z

MMWR

Weekly

July 27, 1990 / 39(29):489-493

Possible Transmission of Human Immunodeficiency Virus to a Patient during an Invasive Dental Procedure

CDC Home | Search | Health Topics A-Z

MMWR

Weekly

January 18, 1991 / 40(2);21-27,33

Epidemiologic Notes and Reports Update: Transmission of HIV Infection during an Invasive Dental Procedure -- Florida

Possible transmission of human immunodeficiency virus (HIV) infection during an invasive dental

Transmission of HIV from infected health-care workers to patients

Carol A. Ciesielski*, David M. Bell† and Donald W. Marianos‡

AIDS 1991, **5** (suppl 2):S93–S97

Keywords: HIV transmission, health-care worker, HIV nosocomial transmission.

Introduction

Since the publication of the first report of possible transmission of HIV to a patient during an invasive dental procedure [1], and the two subsequent reports that strongly suggested that four additional patients were infected with HIV during the course of their dental care [2,3], widespread debate has ensued among the public health, medical, and dental communities; federal and state legislatures; the media; and the public about whether HIV-infected health-care workers should perform invasive medical and dental pro-

available for 80%; 6782 (4.7%) were reported to be health-care workers. Of these, 728 were physicians, 46 were surgeons, and 190 were dental workers (dentist and allied professionals). Seventy per cent of these physicians, surgeons, and dental workers are reported to have died. Of those in the three occupations mentioned above, who represent those health-care workers most likely to perform invasive procedures, 94% reported non-occupational risks for HIV infection. Most of the remaining 6% are still being followed-up by health departments to determine the mode of exposure to HIV. Based on experience gained in investi-

5 January 1999 Volume 130 Number 1

Annals of Internal Medicine

Probable Transmission of HIV from an Orthopedic Surgeon to a Patient in France

JOURNAL OF VIROLOGY, May 1998, p. 4537–4540
0022-538X/98/$04.00+0

Vol. 72, No.

Molecular Evidence for Nosocomial Transmission of Human Immunodeficiency Virus from a Surgeon to One of His Patients

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AJIC clinical case study

Lookback investigation of patients potentially exposed to HIV type 1 after a nurse-to-patient transmission

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Nadège Baffoy, PharmD[a]

Second case of doctor-to-patient HIV transmission

In March, Spanish health authorities reported what is believed to be the second world case of doctor-to-patient HIV transmission. The case involves a gynaecologist who passed on HIV to a woman during a caesarean section. The Official Medical College of Barcelona (COMB) announced the case on March 18 after it was leaked to the press that another woman assisted by the same gynaecologist had been recalled for an HIV test.

identity has not been disclosed, was unaware of his HIV status and had been a practising gynaecologist since 1998.

Once the case was notified, 275 women who had been assisted by the same obstetrician were recalled. Joan Guix, manager at the Agency of Public Health of Barcelona, said that, of the 250 women tested so far, none had an HIV infection. Guix noted that the recall process was "very delicate" and

said Bruguera. He noted that the COMB code of ethics "recommends its doctors avoid procedures involving infectious diseases transmission risk" but have no obligation to fulfil such recommendation.

It is not the first time that doctor-to-patient HIV transmission has been reported. According to the US Centers for Disease Control and Prevention, investigation of the patients of David Acer, a Florida dentist with AIDS,

Documented cases

Countries	Source	Patients involved	Lookback	Phylogenetic analysis
US, Florida	**Dentist**	• **6** patients infected between 1987-1989 • Mechanism not identified	1100 tested	Highly similar
France	**Orthopaedic surgeon** (CD4: 46 cells/ml)	• **1** patient infected in 1992 • During hip OT	983 tested	Closely related
France	**Nurse** (advanced HIV HCV coinfected)	• **1** patients infected in 1996 • Mechanism not identified	2294 tested	Strongly supported
Spain	**Gynaecologist**	• **1** patients infected in 2001 • During caesarean section	250 tested	Highly similar

The risk (UK)

- > 30 patient notification exercises & ~ 10,000 patients have been tested, **no transmission**.
- Current risk for the **most invasive type of EPP** by any HCW is estimated to be between **1 in 1,672,000 and 1 in 4,680,000.**
- **110** HCW are HIV +ve in UK
- If they performed EPPs, the risk of transmission would be increased to between **1 in 1,671,000 and 1 in 4,076,000**, or one additional HIV transmission **every 40 to 2,500 years**.
- If undiagnosed HCWs come forward for Dx & Rx, it will offset this additional risk partially or completely

The risk

Table 5: **Reported numbers of patients tested for HIV after undergoing a higher risk (category 3 EPP) procedure by an HIV-infected HCW: UK and international data**

	Number of incidents/studies	Number of category 3 EPP patients tested	Number patients positive	Plausible risk of transmission (a 3 in 4 chance the risk is less than this value and a 1 in 4 chance the risk is greater than this value)	Upper 95% confidence intervals
UK lookbacks[1]	15	2283	0	1 in 1600	1 in 620
US lookbacks[2]	5	1876	0	1 in 1400	1 in 510
Total	**17**	**4159**	**0**	**1 in 3000**	**1 in 1120**

Table 6: **Possible number of transmissions (with and without effective cART) if HIV-infected HCWs undertaking category 3 EPPs were allowed to resume work.**

	Level of risk used in calculation	Risk estimate expressed as 1 per xxxx	Estimated number of transmissions per year if HIV-infected surgeons referred to UKAP between 2004-2009 were allowed to perform category 3 EPPs[1]	Possible transmission risk estimate based on a 20-fold reduction with cART[2,3]	Estimated number of transmissions if HIV-infected surgeons referred to UKAP between 2004-2009 were allowed EPP3 practice and were taking effective cART
		No antiretroviral therapy		cART	
UK lookback estimate	Plausible risk of transmission	1 in 1600	1.6 per year	1 in 32,780	1 every 12 years
Total lookback estimate (UK + US lookbacks)	Plausible risk of transmission	1 in 3000	0.9 per year	1 in 60,000	1 every 22 years
Bell risk estimate[4]	Mean	1 in 42,000	0.07 per year	1 in 833,320	1 every 303 years

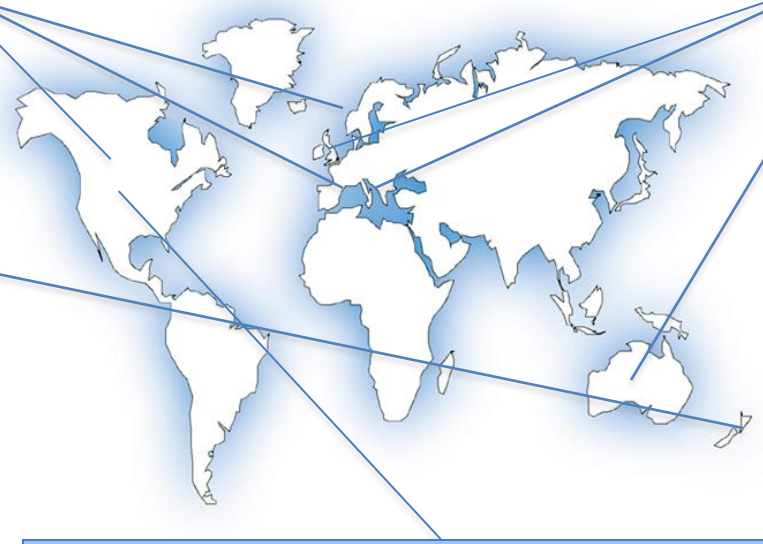
Management of HIV-infected Healthcare Workers. The Report of the Tripartite Working Group. April 2011, Department of Health.

Risk of transmission in the era of Highly active anti-retroviral therapy (HAART)

- No data for transmission from HCW to patients
- May be extrapolated from **vertical transmission**
- In UK, vertical transmission of HIV
  - No intervention (Caesarean section or HAART): **20%**
  - On HAART: **0.8%**
  - On HAART and achieved viral suppression: **0.1%**
  - **Therefore risk decreases by 200 folds with HAART**

Management in other countries

Management on case-by-case basis:
- Canada
- Austria & Belgium
- Finland & Sweden
- New Zealand
- France



Restricted to perform EPP:
- UK & Ireland
- Italy & Malta
- Australia

US: (since 2010)
- Not restricted to perform category 1 & 2 procedures
- Allow to perform category 3 only if the HIV viral load <500 cpm

MMWR
Recommendations and Reports
July 12, 1991 / 40(RR08);1-9

Recommendations for Preventing Transmission of Human Immunodeficiency Virus and Hepatitis B Virus to Patients During Exposure-Prone Invasive Procedures

This document has been developed by the Centers for Disease Control (CDC) to update recommendations for prevention of transmission of human immunodeficiency virus (HIV) and hepatitis B virus (HBV) in the health-care setting. Current data suggest that the risk for such transmission from a health-care worker (HCW) to a patient during an invasive procedure is small; a precise assessment of the risk is not yet available. This document contains recommendations to provide guidance for prevention of HIV and HBV transmission during those invasive procedures that are considered exposure-prone. INTRODUCTION

Recommendations have been made by the Centers for Disease Control (CDC) for the prevention of transmission of the human immunodeficiency virus (HIV) and the hepatitis B virus (HBV) in health-care settings (1-6). These recommendations emphasize adherence to universal precautions that require that blood and other specified body fluids of all patients be handled as if they contain blood-borne pathogens (1,2).

US recommendations 1991

- All HCWs should adhere to **universal precautions**
- HCWs who perform EPP should know their HIV antibody status.
- HCWs who are infected with HIV or HBV (and are HBeAg positive) **should not perform EPP** unless they have sought counsel from an **expert review panel** and been advised under what circumstances, if any, they may continue to perform these procedures.
- Such circumstances would include **notifying prospective patients** of the HCW's seropositivity before they undergo EPP.
- Mandatory testing of HCWs for HIV is not recommended.

- Statement in 2004
- Guidelines 1991 by CDC was **not scientific based**, not cost-effective, and were **intrusive** to the extreme.
- The recommendations were **irrelevant and counterproductive**.
- CDC ignored the overwhelming testimony of the scientific community, and the fact that all currently available data indicate that transmission from surgeon to patient in a hospital setting continues to be a hypothetical event.
- Available data indicate that **transmission of HIV infection** from physician, surgeon, or nurse to patient is **extremely rare**.
- **Mandatory testing and limiting of work, are not justified**.

Society of Healthcare Epidemiology of American (SHEA) 2010 recommendation

TABLE 1. Summary Recommendations for Managing Healthcare Providers Infected with Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and/or Human Immunodeficiency Virus (HIV)

Virus, circulating viral burden	Categories of clinical activities[a]	Recommendation	Testing
HBV			
$<10^4$ GE/mL	Categories I, II, and III	No restrictions[b]	Twice per year
$\geqslant 10^4$ GE/mL	Categories I and II	No restrictions[b]	NA
$\geqslant 10^4$ GE/mL	Category III	Restricted[c]	NA
HCV			
$<10^4$ GE/mL	Categories I, II, and III	No restrictions[b]	Twice per year
$\geqslant 10^4$ GE/mL	Categories I and II	No restrictions[b]	NA
$\geqslant 10^4$ GE/mL	Category III	Restricted[c]	NA
HIV			
$<5 \times 10^2$ GE/mL	Categories I, II, and III	No restrictions[b]	Twice per year
$\geqslant 5 \times 10^2$ GE/mL	Categories I and II	No restrictions[b]	NA
$\geqslant 5 \times 10^2$ GE/mL	Category III	Restricted[d]	NA

b: the infected HCW

(1) Not detected as having transmitted infection to patients;
(2) Obtains advice from an **Expert Review Panel** about continued practice;
(3) Follow-up routinely by **Occupational Medicine staff**
(4) Follow-up by **HIV physician** and who is allowed to communicate with the Expert Review Panel about the provider's clinical status
(5) Consults with an expert about optimal **infection control procedures**
(6) Agrees to the information in and signs a **contract or letter** from the Expert Review Panel that characterizes her or his responsibilities

Date

Dear Dr. [Name]:

[Hospital or Health Department name]'s Expert Advisory Panel on Infected Healthcare Workers met on [date], to discuss your case. The Panel reviewed the medical literature relevant to healthcare workers infected with [HBV, HCV, HIV]. In addition, we reviewed guidelines, including the 1991 CDC Guideline pertaining to healthcare workers infected with bloodborne pathogens and the position statements of selected medical professional societies pertaining to the guideline. The Panel concluded the following:

You are permitted to continue your [specialty/subspecialty] training or practice at [hospital name]. If you agree to the Panel requirements below, it is mutually understood that you will comply with the following guidelines:

- You must double-glove for all [discipline] procedures, whether those procedures are carried out in the operating room, in an imaging suite, at the bedside, or in a treatment room.

- You must change gloves approximately every 2-3 hours, or in the event that glove damage occurs during a procedure. Glove damage has been shown to occur more frequently during longer procedures, and has been specifically associated with certain activities, (e.g., tying sternal wires). You are encouraged to increase your frequency of glove changes under such circumstances.

- You should avoid digital palpation of needle tips and blind probing in poorly visualized or highly confined anatomic sites.

- If you suffer an injury which penetrates your gloves and skin, but during which you do not observe contact of your blood with the surgical field, you should check your hands to be certain you are not bleeding. If you are not bleeding, you may rejoin the case after changing gloves. If you are bleeding, you should withdraw from the case. If the device that injured you recontacted the patient, you must notify [your representative to the expert review panel] who must assure that the patient is made aware of the potential exposure and is treated appropriately.

- If you suffer an injury that causes you to bleed during a procedure and your blood contacts the surgical field, you must withdraw from the case and contact [your representative to the expert review panel], immediately. She/he will assure that the patient will be informed that a possible [HBV/HCV/HIV] exposure has taken place and the patient will be offered appropriate postexposure management, including immuno-/chemoprophylaxis and follow-up, as appropriate. To the extent possible, your identity will be protected.

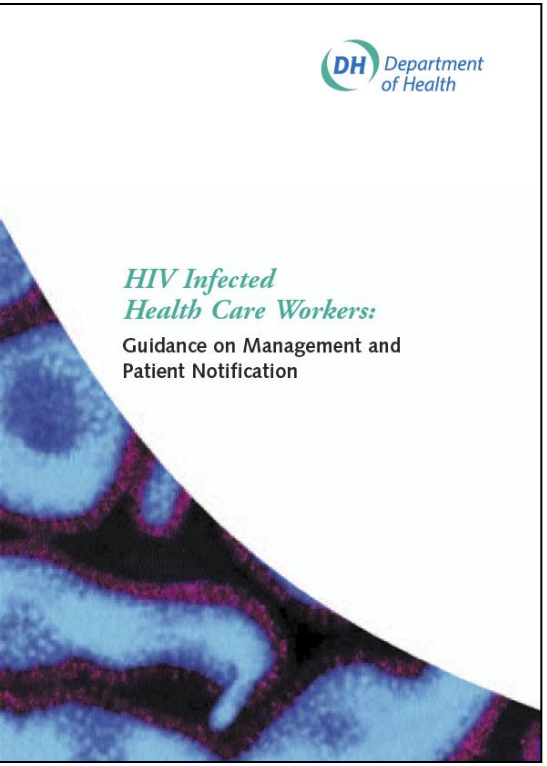
- The Panel requests that you continue under the care of a physician with expertise in [HBV/HCV/HIV] medicine in order to appropriately monitor and manage your illness.

If you agree to the outlined restrictions on your practice, please sign below.

Signature:_____ Date:_____

Witness:_____ Date:_____
[Name, Expert Advisory Panel Representative]

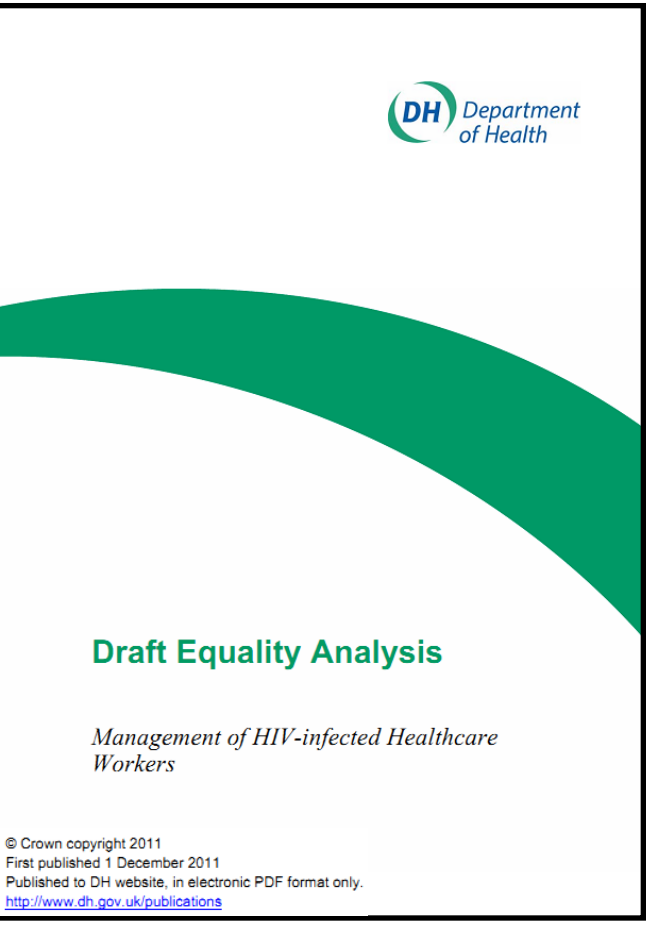
UK guidance 2005



- HIV infected HCW must **not** perform any EPP
- Patients notification exercise:
  - **Evidence of HIV transmission**: notification of **all patients** who have undergone EPP by that HCW should take place.
  - **No evidence of HIV transmission**: all patients who have undergone **category 3 procedures** by the HCW should be notified.
  - Only **category 1 or 2 procedures** done: patient notification will **not be necessary**, unless the other relevant considerations suggest that it is

Drawback: didn't take viral load and clinical condition of the HCW into consideration

2011 December consultation paper proposed framework



- HIV-infected HCWs are permitted to perform **any EPP** if they are **on HAART** and have a viral load **<200 copies/ml.**
- Testing every **3 months** while continuing to perform EPPs.
- HIV-infected HCWs will be under the joint supervision of a consultant in **occupational medicine and their treating physician.**
- **New** HCWs, including students, who will perform EPPs should be **tested for HIV** infection early in the appointments/admissions process

Management in Hong Kong

Professional code and conduct
香港註冊醫生專業守則

- In part II, section 24.2.3: Rights and responsibilities of HIV-infected medical practitioners

24.2.3.1 Confidentiality :

- Medical practitioners are **not required** to disclose their HIV status to their employers or clients.
- HIV infection and AIDS are **not notifiable diseases** by law in HK, and reporting is on a **voluntary basis**.
- HIV status has to be made known on a **need-to-know basis**, and this will normally be with the consent of the infected practitioner.
- In exceptional circumstances, breach of confidentiality may be warranted, for instance, when an HIV-infected medical practitioner **refuses to observe the restrictions** and patients have been **put at risk**

Professional code and conduct

24.2.3.2 Right to work

- The status and rights of an HIV-infected medical practitioner as an employee should be safeguarded.
- If work restriction is required, employers should make arrangement for alternative work, with provision for **retraining and redeployment**.

Professional code and conduct

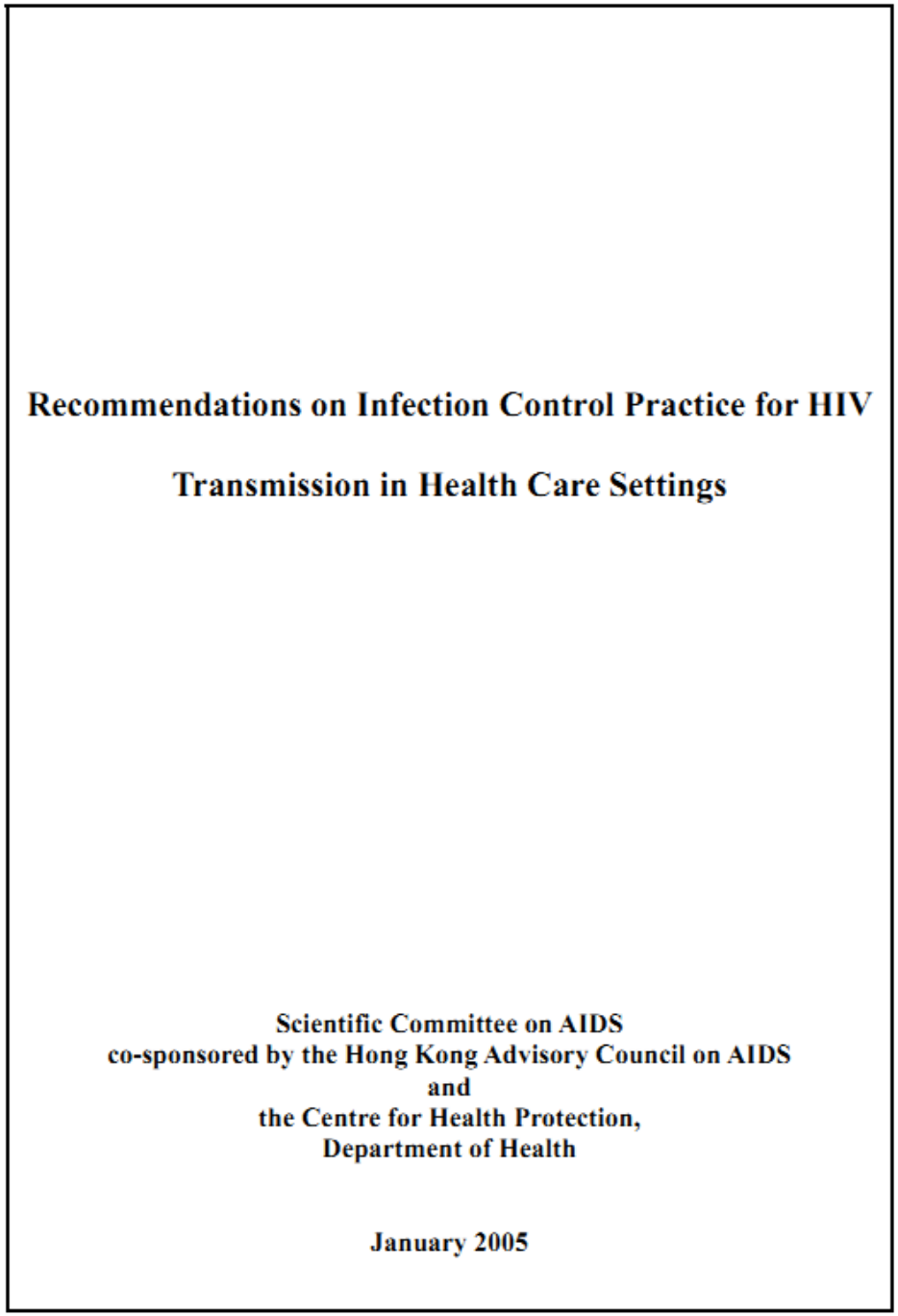
24.2.3.3 Ethical issues

- An HIV-infected medical practitioner should seek appropriate counselling and to act upon it when given.
- It is **unethical** if one fails to do so as patients are put at risk.
- The attending doctor of an HIV-infected medical practitioner should seek the advice of the **expert panel** formed by the **Director of Health** on the areas of management and possible need for job modification
- The doctor who has counselled an HIV-infected colleague on job modification and who is aware that the advice is not being followed and patients are put at risk has a duty to **inform the Medical Council for appropriate action**.

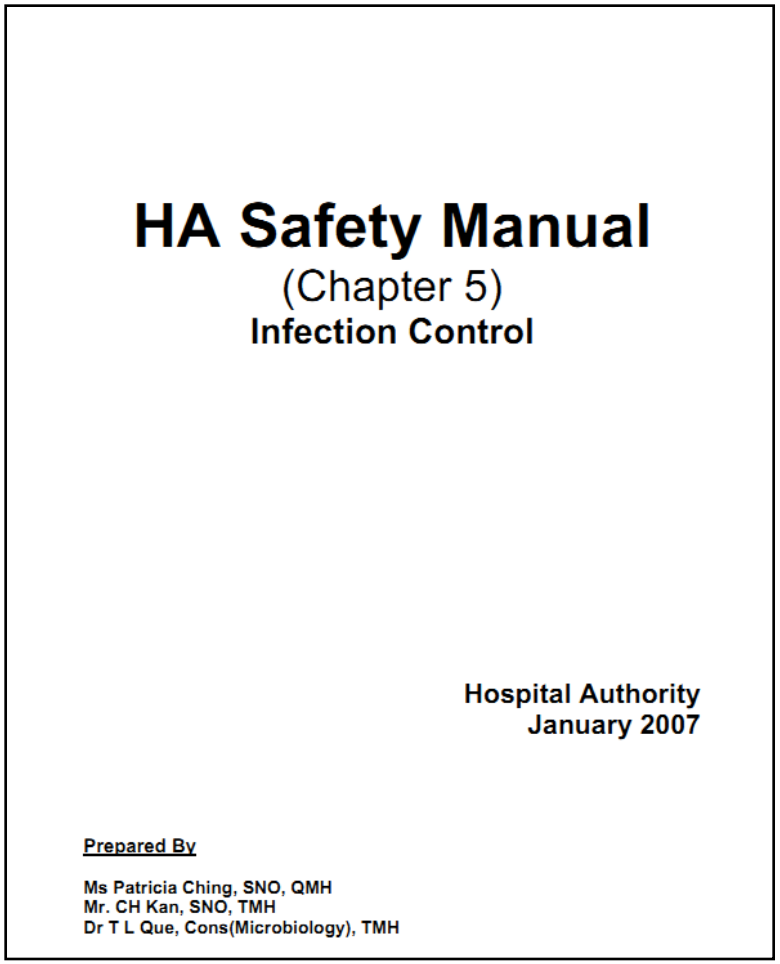
Professional code and conduct

24.2.4 Responding to the public

- Focusing on health-care setting in fact deflects the society from proper attention to the major transmission routes through sex and drug abuse.
- The health care profession has the duty of constantly **reassuring the public**, and to **educate the clients** on how HIV can and cannot be contracted.
- More importantly, the public looks on the health-care profession as an example of how AIDS should be dealt with.
- By **adhering to the guidelines** for prevention of HIV infection in the health-care setting, public fear can be allayed



Recommendation on work restriction



4.6 Recommendation on Work restrictions for healthcare workers exposed to, or infected with, selected infectious diseases

It is recommended that the **Infection Control Unit** and **Staff Clinic** would formulate the **work restrictions** protocols for healthcare workers.

為什麼你有這樣的郵票。如果你舔後，有機會受到感染的 。

Thank