留置導尿管相關泌尿道感染

Catheter-Associated Urinary Tract Infection (CAUTI) Event

科研計畫主持人：施智源

授課講師：北部場(馬偕)：姜秀子
中部場(中榮)：姜秀子

台灣感染管制學會 製作

資料來源：

1. http://www.cdc.gov/ (美國疾病管制中心)
2. http://www.cdc.gov.tw/(台灣衛生福利部疾病管制署)

學習目標(Goal)

- 瞭解目前美國疾病管制中心對醫療照護相關感染-相關規範及細則說明。
- 瞭解醫療照護相關泌尿道感染收案時常見的問題。
- 能正確執行醫療照護相關泌尿道感染收案業務。
- 提昇感染管制人員執行醫療照護相關泌尿道感染收案之一致性與正確性。

學習對象(Object)

- 具感染管制師、感染管制員証書
- 具感染症專科醫師証書

課程大綱(Outline)

- 前言
- 醫療照護相關泌尿道感染-定義介紹
- 醫療照護相關泌尿道感染-相關規範及細則說明
- 醫療照護相關泌尿道感染-案例實務討論

前言(Introduction)

前言(Introduction)

- 泌尿道感染(urinary tract infections)和肺炎(pneumonia)是醫療照護相關感染中最常見的感染，僅次於外科部位感染(SSIs)。

- 在急性醫療照護機構中有超過15%的泌尿道感染被報告*。幾乎所有的醫療照護相關泌尿道感染都是和尿道的醫療裝置有關。

- * Magill SS, Hellinger W, et al. Prevalence of healthcare-associated infections in acute care facilities. Infect Control Hosp Epidemiol. 2012;33:283-91.

前言(Introduction)

留置導尿管相關泌尿道感染可導致的併發症

併發症 (常見)	併發症(少見)
■膀胱炎(cystitis)	■心內膜炎(endocarditis)
■腎盂腎炎(pyelonephritis)	■脊椎骨髓炎(vertebral osteomyelitis)
■革蘭氏陰性菌血症 (gram-negative bacteremia)	■膿毒性關節炎(septic arthritis)
■前列腺炎(prostatitis)	■眼內炎(endophthalmitis)
■副睪炎(epididymitis)	■腦膜炎(meningitis)
■男性的睪丸炎(orchitis)	

前言(Introduction)

- 留置導尿管相關泌尿道感染會造成病人不適、延長住院天數、增加病人死亡率*。每年有超過13,000人死亡與泌尿道感染有關#。

*Scott Rd. The Direct Medical Costs of Healthcare-Associated Infections in U.S. Hospitals and the Benefits of Prevention, 2009. Division of Healthcare Quality Promotion, National Center for Preparedness, Detection, and Control of Infectious Diseases, Coordinating Center for Infectious Diseases, Centers for Disease Control and Prevention, February 2009.

Klevens RM, Edward JR, et al. Estimating health care-associated infections and deaths in U.S. hospitals, 2002. Public Health Reports 2007;122:160-166.

泌尿道感染收案標準
(Urinary Tract Infection Definitions)

醫療照護相關泌尿道感染
Urinary tract infection

泌尿道感染(UTI收案定義)被區分為

1. 有症狀的泌尿道感染(Symptomatic urinary tract infection；SUTI)
2. 無症狀的菌尿症(Asymptomatic Bacteremic UTI ；ABUTI)

*其收案標準見表一及圖1-5

圖1：留置導尿管相關的有症狀的泌尿道感染之判定與分類

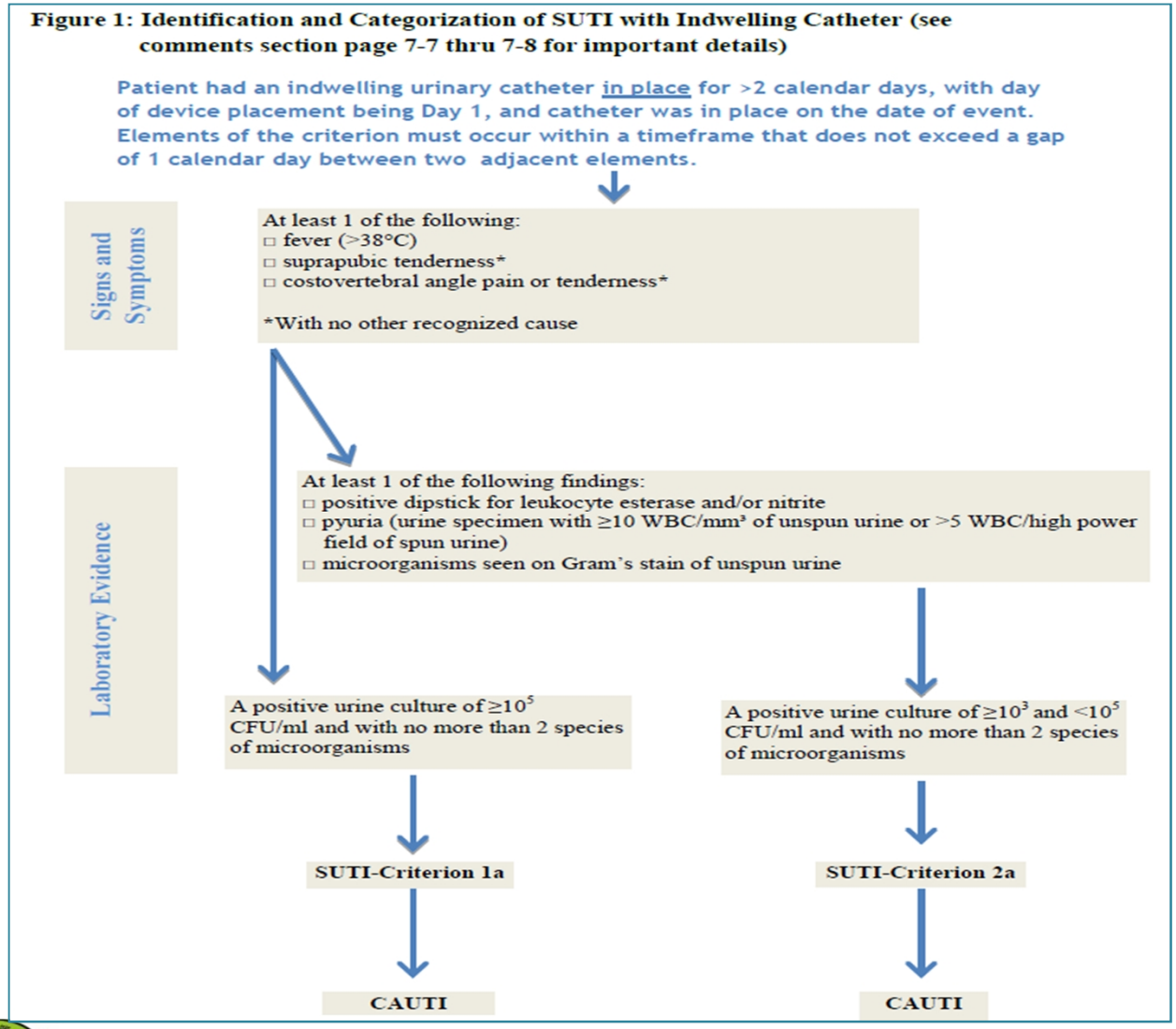

圖 1：留置導尿管相關的有症狀的泌尿道感染之判定與分類(詳細說明見 7-7 頁到 7-8 頁之註釋)

病人已有留置導尿管放置大於 2 天，導尿管放置日即為導管裝置使用第 1 天，感染當天留置導尿管是存在的。收案標準條件必須發生在同一時間內即兩項收案標準條件不可以超過 1 天。

↓

徵象或症狀

至少須符合下列標準其中之一者

☐發燒(>38℃)

☐恥骨上壓痛*

☐肋脊角疼痛或壓痛*

沒有其他確認的原因

實驗室數據

至少有下列任一項

☐對白血球酯酶(leukocyte esterase)或亞硝酸鹽(nitrite)呈陽性反應

☐膿尿(未離心尿液常規檢查之 WBC≧10/mm^3 或離心尿液高倍視野常規檢查之>5WBC)

☐未經離心之新鮮尿液，經革蘭氏染色檢查，在油鏡下發現有微生物

尿液培養出菌落數介於>10^3 CFU /ml，且微生物不超過 2 種。	尿液培養出菌落數介於≧10^3 及<10^5 CFU /ml，且微生物不超過 2 種。
↓	↓
有症狀的泌尿道感染收案標準 1 a (SUTI 1a)	有症狀的泌尿道感染收案標準 2 a (SUTI 2a)
↓	↓
留置導尿管相關泌尿道感染 (CAUTI)	留置導尿管相關泌尿道感染 (CAUTI)

圖2：已移除留置導尿管相關的有症狀的泌尿道感染之判定與分類

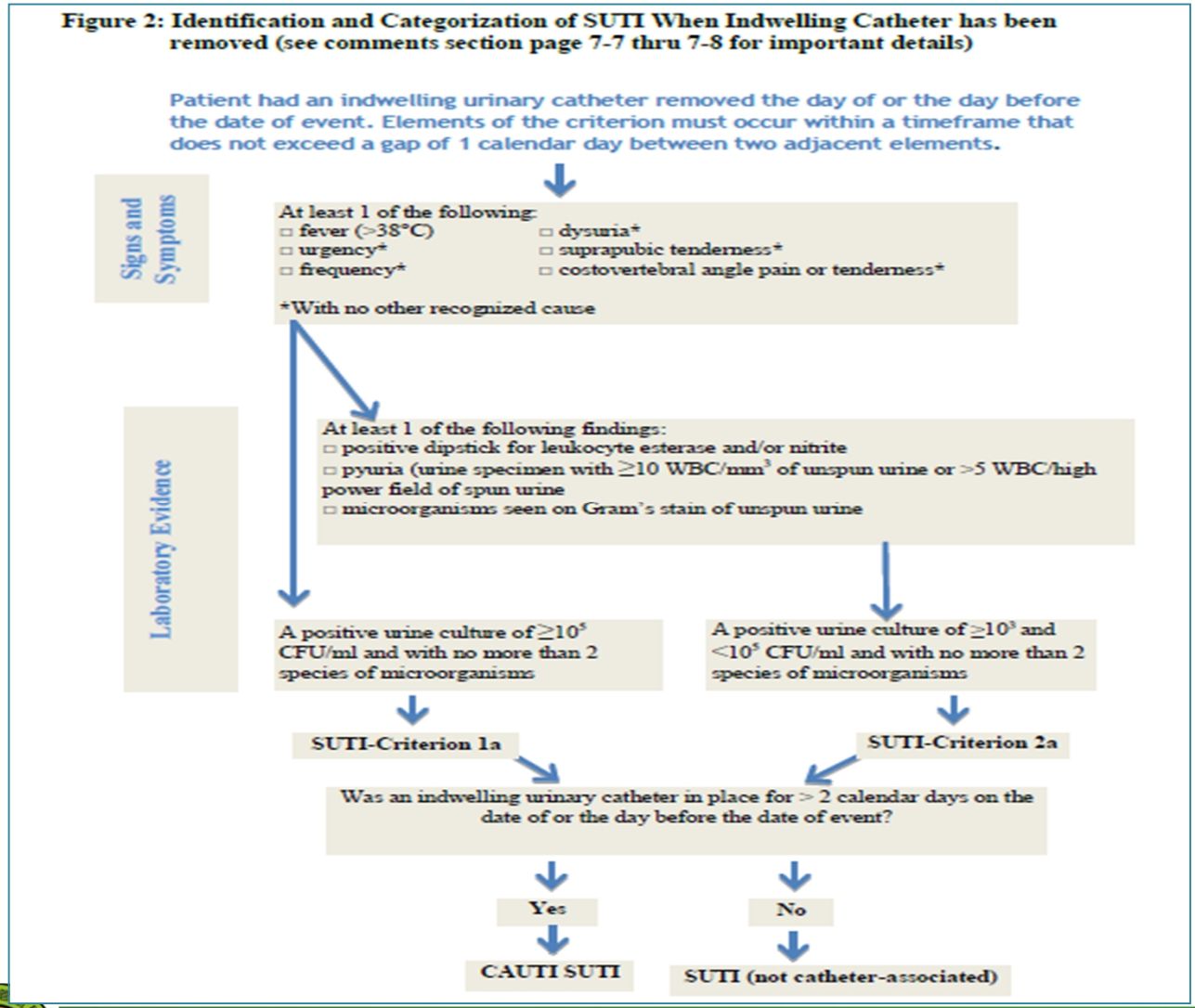

圖 2：已移除留置導尿管相關的有症狀的泌尿道感染之判定與分類(詳細說明見 7-7 頁到 7-8 頁之註釋)

病人在感染日當天或前 1 天移除留置導尿管。收案標準條件發生在同一時間內即兩項收案標準條件不可以超過 1 天。

微象或症狀

至少須符合下列標準其中之一者

- ☐發燒(>38℃)
- ☐解尿困難*
- ☐急尿*
- ☐恥骨上壓痛*
- ☐頻尿*
- ☐肋脊角疼痛或壓痛*

沒有其他確認的原因

實驗室數據

至少有下列任一項

- ☐對白血球酯酶(leukocyte esterase)或亞硝酸鹽(nitrite)呈陽性反應
- ☐膿尿(未離心尿液常規檢查之 WBC≧10/mm^3 或離心尿液高倍視野常規檢查之>5WBC)
- ☐未經離心之新鮮尿液，經革蘭氏染色檢查，在油鏡下發現有微生物

尿液培養出菌落數介於≧10^5 CFU /ml，且微生物不超過 2 種。	尿液培養出菌落數介於≧10^3 及 <10^5 CFU /ml，且微生物不超過 2 種。
有症狀的泌尿道感染收案標準 1 a (SUTI 1a)	有症狀的泌尿道感染收案標準 2 a (SUTI 2a)
有症狀的泌尿道感染收案標準 1 a (SUTI 1a)	有症狀的泌尿道感染收案標準 2 a (SUTI 2a)

病人是否留置導尿管放置大於 2 天且感染當天或前 1 天已有留置導尿管

是	否
留置導尿管相關的有症狀的泌尿道感染（CAUTI SUTI）	（SUTI ）有症狀的泌尿道感(非留置導尿管相關)

圖3：沒有留置導尿管相關的有症狀的泌尿道感染之判定與分類

Figure 3: Identification and Categorization of SUTI without Indwelling Catheter (see comments section page 7-7 thru 7-8 for important details)

Patient did not have an indwelling urinary catheter that had been in place for >2 calendar days and in place at the time of or the day before the date of event. Elements of the criterion must occur within a timeframe that does not exceed a gap of 1 calendar day between two adjacent elements.

Signs and Symptoms

At least 1 of the following:
- fever (>38°C) in a patient that is ≤65 years of age
- urgency*
- frequency*
- dysuria*
- suprapubic tenderness*
- costovertebral angle pain or tenderness*

*With no other recognized cause

Laboratory Evidence

At least 1 of the following findings:
- positive dipstick for leukocyte esterase and/or nitrite
- pyuria (urine specimen with ≥10 WBC/mm^3 of unspun urine or >5 WBC/high power field of spun urine)
- microorganisms seen on Gram's stain of unspun urine

A positive urine culture of ≥10^5 CFU/ml and with no more than 2 species of microorganisms → **SUTI- Criterion 1b**

A positive urine culture of ≥10^3 and <10^5 CFU/ml and with no more than 2 species of microorganisms → **SUTI- Criterion 2b**

圖 3：沒有留置導尿管相關的有症狀的泌尿道感染之判定與分類(詳細說明見 7-7 頁到 7-8 頁之註釋)

病人沒有留置導尿管放置大於 2 天且感染當天或前 1 天也沒留置導尿管。收案標準條件必須發生在同一時間內即兩項收案標準條件不可以超過 1 天。

↓

微象或症狀

至少須符合下列標準其中之一者

☐發燒(>38℃) 此項僅適用 ≦65 歲病人

☐急尿*　　☐恥骨上壓痛*

☐頻尿*　　☐肋脊角疼痛或壓痛*

☐解尿困難*

*沒有其他確認的原因

↓

實驗室數據

至少有下列任一項

☐對白血球酯酶(leukocyte esterase)或亞硝酸鹽(nitrite)呈陽性反應

☐膿尿(未離心尿液常規檢查之 WBC≧10/mm^3 或離心尿液高倍視野常規檢查之>5WBC)

☐未經離心之新鮮尿液，經革蘭氏染色檢查，在油鏡下發現有微生物

↓	↓
尿液培養出菌落數介於>10^5 CFU /ml，且微生物不超過 2 種。	尿液培養出菌落數介於≧10^3 及<10^5 CFU /ml，且微生物不超過 2 種。
↓	↓
有症狀的泌尿道感染收案標準 1 b (SUTI 1b)	有症狀的泌尿道感染收案標準 2 b (SUTI 2b)

圖4：小於等於1歲病人有症狀的泌尿道感染之判定與分類

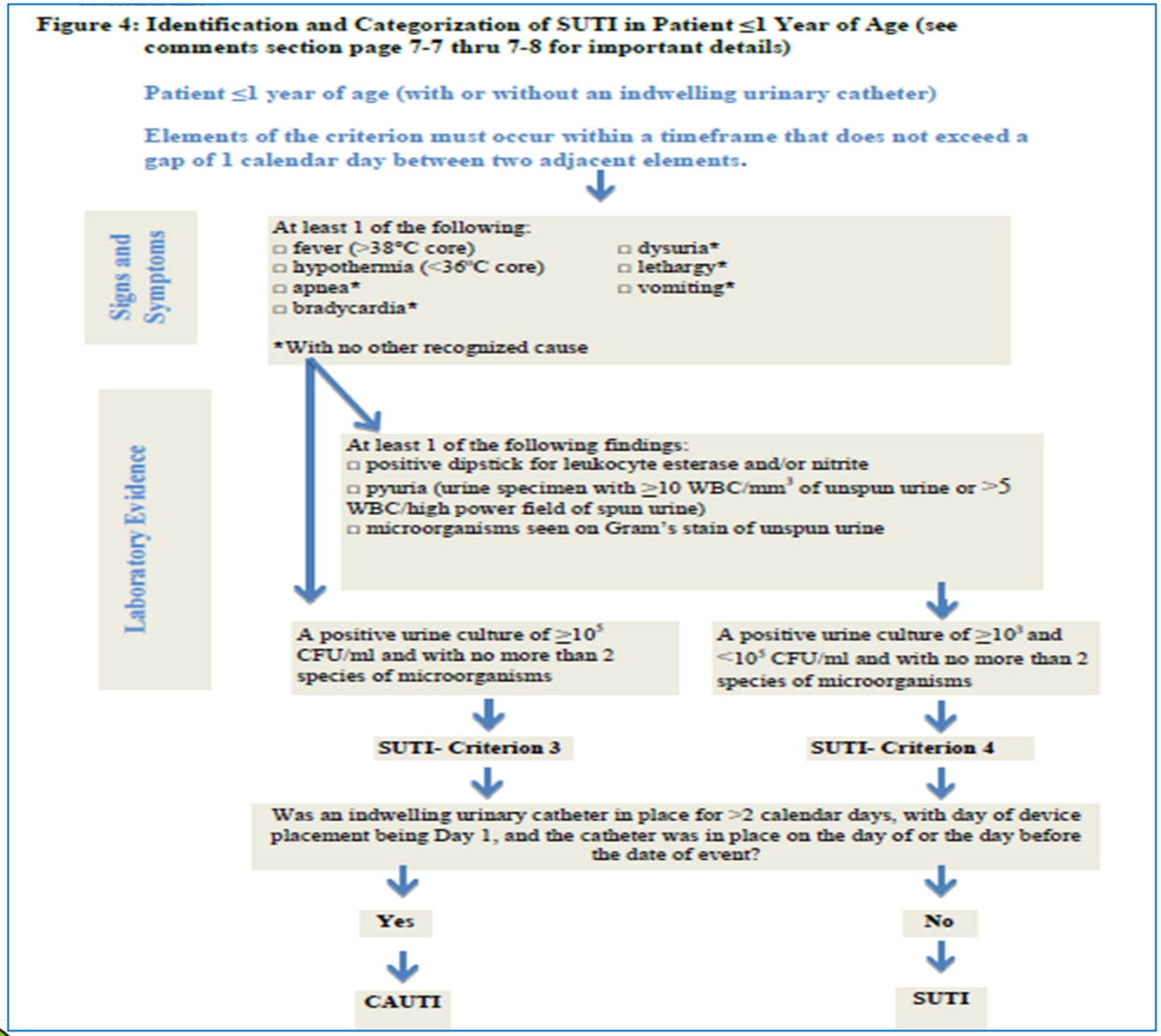

圖 4：小於等於 1 歲病人有症狀的泌尿道感染之判定與分類(詳細說明見 7-7 頁到 7-8 頁之註釋)

≦1 歲之嬰兒，不論有無留置尿管，收案標準條件必須發生在同一時間內即兩項收案標準條件不可以超過 1 天。

↓

徵象或症狀

至少須符合下列標準其中之一者

- ☐發燒(肛溫＞38℃)
- ☐低體溫(肛溫＜36℃)
- ☐呼吸暫停*
- ☐心跳徐緩*
- ☐解尿困難*
- ☐嗜睡*
- ☐嘔吐*

*沒有其他確認的原因

↓

實驗室數據

至少有下列任一項

- ☐對白血球酯酶(leukocyte esterase)或亞硝酸鹽(nitrite)呈陽性反應
- ☐膿尿(未離心尿液常規檢查之 WBC≧10/mm^3 或離心尿液高倍視野常規檢查之>5WBC)
- ☐未經離心之新鮮尿液，經革蘭氏染色檢查，在油鏡下發現有微生物

尿液培養出菌落數介於>10^5 CFU /ml，且微生物不超過 2 種。	尿液培養出菌落數介於≧10^3 及<10^5 CFU /ml，且微生物不超過 2 種。
↓	↓
有症狀的泌尿道感染收案標準 3 (SUTI 3)	有症狀的泌尿道感染收案標準 4 (SUTI4)
↓	↓
病人是否已有留置導尿管放置大於 2 天，導尿管放置日即為導管裝置使用第 1 天，感染當天留置導尿管是否存在?	
↓	↓
是	否
↓	↓
留置導尿管相關泌尿道感染（CAUTI ）	（SUTI ）有症狀的泌尿道感

圖5：無症狀的菌尿症之判定與分類

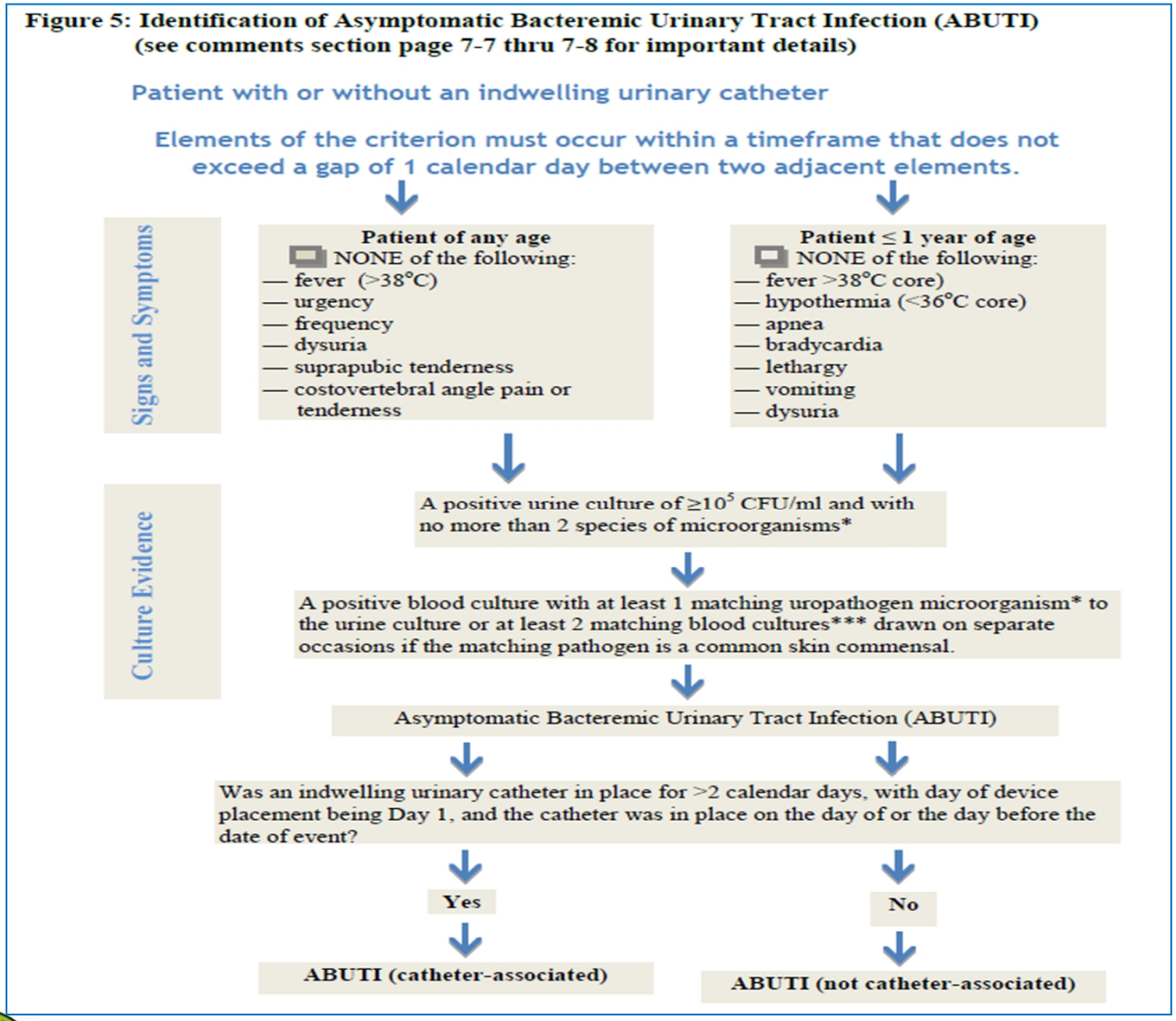

圖 5：無症狀的菌尿症之判定與分類(詳細說明見 7-7 頁到 7-8 頁之註釋)

不論病人是否有留置導尿管。

收案標準條件必須發生在同一時間內即兩項收案標準條件不可以超過 1 天。

徵象或症狀	任何年齡病人 □沒有下列項目 —發燒(>38℃) —急尿 —頻尿 —解尿困難 —恥骨上壓痛 —肋脊角疼痛或壓痛	≦1 歲之嬰兒 □沒有下列項目 —發燒(肛溫>38℃) —低體溫(肛溫<36℃) —呼吸暫停 —心跳徐緩 —嗜睡 —嘔吐 解尿困難
實驗室數據	尿液培養出菌落數介於>10^5 CFU /ml，且微生物不超過 2 種。	
	血液培養陽性且同時培養出的微生物與尿液培養出的微生物致病菌至少一種相關，或至少 2 套血液培養陽性和皮膚上的菌相關	
	無症狀的菌尿症(ABUTI)	
	病人是否已有留置導尿管放置大於 2 天，導尿管放置日即為導管裝置使用第 1 天，感染當天留置導尿管是否感染當天或前 1 天是否有留置導尿管	
	是	否
	無症狀泌尿道感染（ABUTI ）留置導尿管相關	無症狀泌尿道感染 (非留置導尿管相關)

*(有關泌尿道致病原見下列網址http://www.cdc.gov/nhsn/XLS/master-organism-Com-Commensals-Lists.xlsx#uropathogen)

泌尿道致病原菌: Gram-negative bacilli, *Staphylococcus* spp., yeasts, beta-hemolytic *Streptococcus* spp., *Enterococcus* spp., *G. vaginalis*, *Aerococcus urinae*, *Corynebacterium* (urease positive)†.

如果有相同微生物出現時則應進行進一步的菌種鑑定(如去比對菌種配對)。不需另外用微生物之形態學(morphology)及抗藥菌譜(antibiogram)去進行比對，因為每一家機構的檢驗方式和工作細則不一定一樣。

†一般有關 *Corynebacterium* (urease positive) 的菌種形態不是*Corynebacterium species unspecified* (COS) 就是 *C. urealyticum (CORUR) if speciated.*

表1 泌尿道感染收案標準

Criterion	Urinary Tract Infection (UTI)
	Symptomatic UTI (SUTI) Must meet at least 1 of the following criteria:
1a	Patient had an indwelling urinary catheter in place for >2 calendar days, with day of device placement being Day 1, and catheter was in place on the date of event *and* at least 1 of the following signs or symptoms: fever (>38°C); suprapubic tenderness*; costovertebral angle pain or tenderness* *and* a positive urine culture of $\geq 10^5$ colony-forming units (CFU)/ml and with no more than 2 species of microorganisms. Elements of the criterion must occur within a timeframe that does not exceed a gap of 1 calendar day between two adjacent elements. ----------OR---------- Patient had an indwelling urinary catheter in place for >2 calendar days and had it removed the day of or the day before the date of event *and* at least 1 of the following signs or symptoms: fever (>38°C); urgency*; frequency*; dysuria*; suprapubic tenderness*; costovertebral angle pain or tenderness* *and* a positive urine culture of $\geq 10^5$ colony-forming units (CFU)/ml and with no more than 2 species of microorganisms. Elements of the criterion must occur within a timeframe that does not exceed a gap of 1 calendar day between two adjacent elements. *With no other recognized cause
1b	Patient did <u>not</u> have an indwelling urinary catheter that had been in place for >2 calendar days and in place at the time of or the day before the date of event *and* has at least 1 of the following signs or symptoms: fever (>38°C) in a patient that is ≤65 years of age; urgency*; frequency*; dysuria*; suprapubic tenderness*; costovertebral angle pain or tenderness* *and* a positive urine culture of $\geq 10^5$ CFU/ml and with no more than 2 species of microorganisms. Elements of the criterion must occur within a timeframe that does not exceed a gap of 1 calendar day between two adjacent elements. *With no other recognized cause

表1 泌尿道感染收案標準

標準	泌尿道Urinary Tract Infection (UTI)
	有症狀的泌尿道感染Symptomatic UTI (SUTI) 收案標準至少須符合下列標準其中之一者：
1 a	病人已有留置導尿管放置大於2天，導尿管放置日即為導管裝置使用第1天，感染當天留置導尿管是存在的 *和* 必須符合至少下列一項徵象或症狀：發燒(>)、恥骨上壓痛*；或肋脊角疼痛或壓痛*(costovertebral angle pain or tenderness) *和* 且尿液培養出菌落數≧10^5colony-forming units (CFU)/ml，且微生物不超過2種。收案標準條件必須發生在同一時間內即兩項收案標準條件不可以超過1天。
	或
	病人已有留置導尿管放置大於2天且感染當天或前1天移除留置導尿管 *和* 發燒(>)、急尿*、頻尿*、解尿困難*、恥骨上壓痛*、肋脊角疼痛或壓痛 *和* 且尿液培養出菌落數≧10^5colony-forming units (CFU)/ml，且微生物不超過2種。收案標準條件必須發生在同一時間內即兩項收案標準條件不可以超過1天。 *沒有其他確認的原因

表1 泌尿道感染收案標準

標準	泌尿道Urinary Tract Infection (UTI)
	有症狀的泌尿道感染Symptomatic UTI (SUTI) 收案標準至少須符合下列標準其中之一者：
1 b	病人沒有留置導尿管放置大於2天且感染當天或前1天也沒留置導尿管 *和* 必須符合至少下列一項徵象或症狀：發燒(>38℃)(此項僅適用≦65歲病人)、急尿*、頻尿*、解尿困難*、恥骨上壓痛*、肋脊角疼痛或壓痛 *和* 且尿液培養出菌落數≧10^5colony-forming units (CFU)/ml，且微生物不超過2種。收案標準條件必須發生在同一時間內即兩項收案標準條件不可以超過1天。 *沒有其他確認的原因

Criterion	Urinary Tract Infection (UTI)
2a	Patient had an indwelling urinary catheter in place for >2 calendar days, with day of device placement being Day 1, and catheter was in place on the date of event. *and* at least 1 of the following signs or symptoms: fever (>38°C); suprapubic tenderness*; costovertebral angle pain or tenderness* *and* at least 1 of the following findings: a. positive dipstick for leukocyte esterase and/or nitrite b. pyuria (urine specimen with ≥10 white blood cells [WBC]/mm^3 of unspun urine or >5 WBC/high power field of spun urine) c. microorganisms seen on Gram's stain of unspun urine *and* a positive urine culture of ≥10^3 and <10^5 CFU/ml and with no more than 2 species of microorganisms. Elements of the criterion must occur within a timeframe that does not exceed a gap of 1 calendar day between two adjacent elements. ----------OR---------- Patient with an indwelling urinary catheter in place for > 2 calendar days and had it removed the day of or the day before the date of event *and* at least 1 of the following signs or symptoms: fever (>38°C); urgency*; frequency*; dysuria*; suprapubic tenderness*; costovertebral angle pain or tenderness* *and* at least 1 of the following findings: a. positive dipstick for leukocyte esterase and/or nitrite b. pyuria (urine specimen with ≥10 WBC/mm^3 of unspun urine or >5 WBC/high power field of spun urine c. microorganisms seen on Gram's stain of unspun urine *and* a positive urine culture of ≥10^3 and <10^5 CFU/ml and with no more than 2 species of microorganisms. Elements of the criterion must occur within a timeframe that does not exceed a gap of 1 calendar day between two adjacent elements. *With no other recognized cause

表1 泌尿道感染收案標準

標準	泌尿道Urinary Tract Infection (UTI)
	有症狀的泌尿道感染Symptomatic UTI (SUTI) 收案標準至少須符合下列標準其中之一者：
2 a	病人已有留置導尿管放置大於2天，導尿管放置日即為導管裝置使用第1天，感染當天留置導尿管是存在的 *和* 必須符合至少下列一項徵象或症狀：發燒(>38℃)、恥骨上壓痛*；或肋脊角疼痛或壓痛*(costovertebral angle pain or tenderness) *和* 至少有下列任一項： 對白血球酯酶(leukocyte esterase)或亞硝酸鹽(nitrite)呈陽性反應。 膿尿(未離心尿液常規檢查之WBC≧10/mm^{3}或離心尿液高倍視野常規檢查之>5WBC)。 未經離心之新鮮尿液，經革蘭氏染色檢查，在油鏡下發現有微生物。 *和* 且尿液培養出菌落數介於≧10^{3}及<10^5 CFU /ml，且微生物不超過2種。 收案標準條件必須發生在同一時間內即兩項收案標準條件不可以超過1天。 *沒有其他確認的原因
	或

表1 泌尿道感染收案標準

標準	泌尿道Urinary Tract Infection (UTI)
	有症狀的泌尿道感染Symptomatic UTI (SUTI) 收案標準至少須符合下列標準其中之一者：
2 a	病人已有留置導尿管放置大於2天且感染當天或前1天移除留置導尿管 *和* 發燒(>38℃)、急尿*、頻尿*、解尿困難*、恥骨上壓痛*、肋脊角疼痛或壓痛 *和* 至少有下列任一項： 對白血球酯酶(leukocyte esterase)或亞硝酸鹽(nitrite)呈陽性反應。 膿尿(未離心尿液常規檢查之WBC≧10/mm^{3}或離心尿液高倍視野常規檢查之>5WBC)。 未經離心之新鮮尿液，經革蘭氏染色檢查，在油鏡下發現有微生物。 *和* 且尿液培養出菌落數介於≧10^{3}及<10^5 CFU /ml，且微生物不超過2種。 收案標準條件必須發生在同一時間內即兩項收案標準條件不可以超過1天。 *沒有其他確認的原因

Criterion	Urinary Tract Infection (UTI)
2b	Patient did not have an indwelling urinary catheter that had been in place for >2 calendar days and in place at the time of, or the day before the date of event *and* has at least 1 of the following signs or symptoms: fever (>38°C) in a patient that is ≤65 years of age; urgency*; frequency*; dysuria*; suprapubic tenderness*; costovertebral angle pain or tenderness* *and* at least 1 of the following findings: a. positive dipstick for leukocyte esterase and/or nitrite b. pyuria (urine specimen with ≥10 WBC/mm^3 of unspun urine or >5 WBC/high power field of spun urine c. microorganisms seen on Gram's stain of unspun urine *and* a positive urine culture of ≥10^3 and <10^5 CFU/ml and with no more than 2 species of microorganisms. Elements of the criterion must occur within a timeframe that does not exceed a gap of 1 calendar day between two adjacent elements. *With no other recognized cause
3	Patient ≤1 year of age with** or without an indwelling urinary catheter has at least 1 of the following signs or symptoms: fever (>38°C core); hypothermia (<36°C core); apnea*; bradycardia*; dysuria*; lethargy*; vomiting* *and* a positive urine culture of ≥10^5 CFU/ml and with no more than 2 species of microorganisms. Elements of the criterion must occur within a timeframe that does not exceed a gap of 1 calendar day between two adjacent elements. *With no other recognized cause ** Patient had an indwelling urinary catheter in place for >2 calendar days, with day of device placement being Day 1 and catheter was in place on the date of event.
4	Patient ≤1 year of age with** or without an indwelling urinary catheter has at least 1 of the following signs or symptoms: fever (>38°C core); hypothermia (<36°C core); apnea*; bradycardia*; dysuria*; lethargy*; vomiting* *and* at least 1 of the following findings: a. positive dipstick for leukocyte esterase and/or nitrite b. pyuria (urine specimen with ≥10 WBC/mm^3 of unspun urine or >5 WBC/high power field of spun urine c. microorganisms seen on Gram's stain of unspun urine *and* a positive urine culture of between ≥10^3 and <10^5 CFU/ml and with no more than two species of microorganisms. Elements of the criterion must occur within a timeframe that does not exceed a gap of 1 calendar day between two adjacent

Criterion	Urinary Tract Infection (UTI)
	elements. *With no other recognized cause ** Patient had an indwelling urinary catheter in place for >2 calendar days, with day of device placement being Day 1 and catheter was in place on the date of event.

標準	泌尿道Urinary Tract Infection (UTI)
2 b	病人沒有留置導尿管放置大於2天且感染當天或前1天也沒留置導尿管 *和* 必須符合至少下列一項徵象或症狀：發燒(>38℃)(此項僅適用≦65歲病人)、急尿*、頻尿*、解尿困難*、恥骨上壓痛*、肋脊角疼痛或壓痛 *和* 至少有下列任一項： 對白血球酯酶(leukocyte esterase)或亞硝酸鹽(nitrite)呈陽性反應。 膿尿(未離心尿液常規檢查之WBC≧10/mm^{3}或離心尿液高倍視野常規檢查之>5WBC)。 未經離心之新鮮尿液，經革蘭氏染色檢查，在油鏡下發現有微生物。 *和* 且尿液培養出菌落數介於≧10^{3}及<10^5 CFU /ml，且微生物不超過2種。 收案標準條件必須發生在同一時間內即兩項收案標準條件不可以超過1天。 *沒有其他確認的原因

標準	泌尿道Urinary Tract Infection (UTI)
3	≦1歲之嬰兒，不論有**無留置尿管，至少有下述任一項症狀或徵象：發燒(肛溫 > 38℃)、 低體溫(肛溫 < 36℃)、呼吸暫停*、心跳徐緩*、解尿困難*、嗜睡*、嘔吐* *和* 且尿液培養出菌落數≧10^5colony-forming units (CFU)/ml，且微生物不超過2種。收案標準條件必須發生在同一時間內即兩項收案標準條件不可以超過1天。 *沒有其他確認的原因 **病人已有留置導尿管放置大於2天，導尿管放置日即為導管裝置使用第1天，感染當天留置導尿管是存在的

標準	泌尿道Urinary Tract Infection (UTI)
4	≦1歲之嬰兒，不論有**無留置尿管，至少有下述任一項症狀或徵象：發燒(肛溫 > 38℃)、 低體溫(肛溫 < 36℃)、呼吸暫停*、心跳徐緩*、解尿困難*、嗜睡*、嘔吐* *和* 至少有下列任一項： 對白血球酯酶(leukocyte esterase)或亞硝酸鹽(nitrite)呈陽性反應。 膿尿(未離心尿液常規檢查之WBC≧10/mm^{3}或離心尿液高倍視野常規檢查之>5WBC)。 未經離心之新鮮尿液，經革蘭氏染色檢查，在油鏡下發現有微生物。 *和* 且尿液培養出菌落數介於≧10^{3}及<10^5 CFU /ml，且微生物不超過2種。 收案標準條件必須發生在同一時間內即兩項收案標準條件不可以超過1天。 *沒有其他確認的原因 **病人已有留置導尿管放置大於2天，導尿管放置日即為導管裝置使用第1天，感染當天留置導尿管是存在的

Criterion	Asymptomatic Bacteremic Urinary Tract Infection (ABUTI)
	Patient with* or without an indwelling urinary catheter has no signs or symptoms (i.e., for any age patient, no fever (>38°C); urgency; frequency; dysuria; suprapubic tenderness; costovertebral angle pain or tenderness OR for a patient ≤1 year of age; no fever (>38°C core); hypothermia (<36°C core); apnea; bradycardia; dysuria; lethargy; or vomiting) *and* a positive urine culture of ≥10^5 CFU/ml and with no more than 2 species of uropathogen microorganisms** (see Comments section below) *and* a positive blood culture with at least 1 matching uropathogen microorganism t the urine culture, or at least 2 matching blood cultures drawn on separate occasions if the matching pathogen is a common skin commensal. Elements o criterion must occur within a timeframe that does not exceed a gap of 1 calend day between two adjacent elements. *Patient had an indwelling urinary catheter in place for >2 calendar days, with day of device placement being Day 1, and catheter was in place on the date of event. **Uropathogen microorganisms are: Gram-negative bacilli, *Staphylococcus spp.*, yeasts, beta-hemolytic *Streptococcus spp.*, *Enterococcus spp.*, *G. vaginalis*, *Aerococcus urinae*, and *Corynebacterium* (urease positive)[+]. [+]Report *Corynebacterium* (urease positive) as either *Corynebacterium species unspecified (COS)* or as *C. urealyticum* (CORUR) if so speciated. (See complete list of uropathogen microorganisms at http://www.cdc.gov/nhsn/XLS/master-organism-Com-Commensals-Lists.xlsx#uropathogens)
Comments	• Laboratory cultures reported as "mixed flora" represent at least 2 species of organisms. Therefore an additional organism recovered from the same culture, would represent >2 species of microorganisms. Such a specimen cannot be used to meet the UTI criteria. • Urinary catheter tips should not be cultured and are not acceptable for the diagnosis of a urinary tract infection. • Urine cultures must be obtained using appropriate technique, such as clean catch collection or catheterization. Specimens from indwelling catheters should be aspirated through the disinfected sampling ports. • In infants, urine cultures should be obtained by bladder catheterization or suprapubic aspiration; positive urine cultures from bag specimens are unreliable and should be confirmed by specimens aseptically obtained by catheterization or suprapubic aspiration. • Urine specimens for culture should be processed as soon as possible, preferably within 1 to 2 hours. If urine specimens cannot be processed within 30 minutes of collection, they should be refrigerated, or inoculated into primary isolation medium before transport, or transported in an appropriate urine preservative. Refrigerated specimens should be cultured within 24 hours. • Urine specimen labels should indicate whether or not the patient is symptomatic. • Report only pathogens in both blood and urine specimens for ABUTI. • Report *Corynebacterium* (urease positive) as either *Corynebacterium species* unspecified (COS) or as *C. urealyticum* (CORUR) if speciated.

標準	無症狀的菌尿症Asymptomatic Bacteremic Urinary Tract Infection (ABUTI)
	不論病人是*否有留置導尿管，病人無任何症狀或徵象(如任何年齡的病人，沒有發燒(＞)、急尿、頻尿、解尿困難、恥骨上壓痛或肋脊角疼痛和壓痛，或≦1歲之嬰兒，沒有發燒(肛溫＞)、低體溫(肛溫＜)、呼吸暫停、心跳徐緩、解尿困難、嗜睡、嘔吐) *和* 且尿液培養出菌落數≧10^5colony-forming units (CFU)/ml，且泌尿道致病原(uropathogen)不超過2種**(見以下評論)。 *和* 血液培養陽性，且培養出的微生物至少有一種與尿液培養出的泌尿道致病原相同，或如為皮膚上的正常菌叢則需血液培養至少2套相同。收案標準條件必須發生在同一時間內即兩項收案標準條件不可以超過1天。

標準	無症狀的菌尿症Asymptomatic Bacteremic Urinary Tract Infection (ABUTI)
	*病人已有留置導尿管放置大於2天，導尿管放置日即為導管裝置使用第1天，感染當天留置導尿管是存在的 **泌尿道致病原包括：Gram-negative bacilli, Staphylococcus spp., yeasts, beta-hemolytic Streptococcus spp., Enterococcus spp., Gardnerella vaginalis, Aerococcus urinae, and Corynebacterium (urease positive)。 +Report *Corynebacterium* (urease positive) as either *Corynebacterium species unspecified (COS*) or as *C. urealyticum* (CORUR) if so speciated (See complete list of uropathogen microorganisms at http://www.cdc.gov/nhsn/XLS/master-organism-Com-Commensals-Lists.xlsx#uropathogens)

標準	無症狀的菌尿症Asymptomatic Bacteremic Urinary Tract Infection (ABUTI)
註釋	● 實驗室微生物培養結果如果是至少2種以上微生物則稱為"混合菌叢；mixed flora"。所以在同一個尿液檢體微生物培養結果大於2種以上微生物，入此結果就不能成為泌尿道感染收案標準條件。 ● 導尿管的尖端(Urinary catheter tips)不應該送培養，導尿管的尖端培養結果不能作為診斷泌尿道感染的條件。 ● 尿液培養必須使用以適當技術留取尿液檢體，例如：清潔留取的中段尿或單導留取的尿液檢體。當由留置導尿管採取檢體時，應在採檢口先以消毒劑消毒，再以無菌空針抽取

標準	無症狀的菌尿症Asymptomatic Bacteremic Urinary Tract Infection (ABUTI)
註釋	● 嬰兒的尿液培養檢體則應以無菌技術自恥骨上方抽取或單導留取。由尿袋檢體培養陽性的結果做為診斷依據並不可靠，應該再以無菌技術自恥骨上方抽取或單導留取確認。 ● 收集好的尿液培養檢體，最好於1-2小時內儘速檢驗。如無法於30分鐘內送驗，應冷藏保存，或在傳送前先接種到初步培養基(primary isolation)，或加入適當的尿液保存劑保存及傳送。冷藏的檢體要在24小時內檢驗。 ● 檢體盒上應清楚標示病人是否有泌尿道感染症狀。

標準	無症狀的菌尿症Asymptomatic Bacteremic Urinary Tract Infection (ABUTI)
註釋	● 所有無症狀泌尿道感染的病人，因收案標準須符合血液培養陽性，且培養出的微生物至少有一種與尿液培養出的泌尿道致病原相關，故都應被紀錄為續發性血流感染。 ● 尿液培養結果為Corynebacterium (urease positive)時，應報告為Corynebacterium species unspecified (COS)，如果能確定的話則應報告為C. urealyticum (CORUR)」。

醫療照護相關泌尿道感染-相關規範及細則說明

(Settings and Requirements)

留置導尿管(Indwelling catheter)

- 留置導尿管係指經尿道插入膀胱且導尿管末端應連接至封閉的尿液引流袋(包括腿部引流袋）。
- 這些相關裝置也稱為留置導尿管(Foley catheters)。

留置導尿管(Indwelling catheter)

- 尿套(Condom)或短導尿管(straight in-and-out catheters)和腎管(nephrostomy tubes)或恥骨上尿管(suprapubic catheters)都不能稱為留置尿管(Foley catheters)。

- 除非腎管(nephrostomy tubes)或恥骨上尿管(suprapubic catheters)是使用留置尿管(Foley catheters)。

留置導尿管(Indwelling catheter)

- 留置導尿管(Indwelling catheter)無論是間歇或連續灌洗使用都應該包含在留置導尿管相關泌尿道感染(CAUTI)監測範圍內。

適用範圍(Settings)

- 監測醫院內所有任何一位住院中病人的資料收集，包括加護病房(critical intensive care units；ICU)、專科病房區(specialty care areas；SCA)、中途單位(step down units)、長期照護單位(long term care wards)。

- 當病人出院離開醫院後則不需列入監測對象。

- 如果真的有留置導尿管相關泌尿道感染發生，則應在病人出院當天或隔天通報美國疾病預防控制中心的全國醫療照護安全網(NHSN)；建議出院後第1天通報。如果沒有導尿管裝置的則不需通報。

規範(Requirements)

- 所有住院病人之留置導尿管相關尿路感染監測，應至少每個月被統計及通報一次。

事件日期(Date of event)

- 所謂泌尿道感染日期是指當泌尿道感染發生時符合所有收案標準的日期謂之。

- 別名(Synonym)：感染日期

留置導尿管相關泌尿道感染(Catheter-associated UTI ；CAUTI)

- 泌尿道感染係指留置導尿管在符合感染日期時已被放置大於2天，但留置管路裝置是第1天，

和

- 留置導尿管是在感染日期時或之前已存在。如果留置導尿管是被放置大於2天然後被移除，泌尿道感染收案標準必須在是留置導尿管被移除時或移除隔天(next day)符合收案標準。

留置導尿管相關泌尿道感染(Catheter-associated UTI ；CAUTI)

例如：

- 病人在住院期間有留置導尿管，經由監測符合泌尿道感染收案標準。但因為留置導尿管沒有被放置大於2天，即使符合所有收案標準則不能算留置導尿管相關泌尿道感染(CAUTI)。

留置導尿管相關泌尿道感染(Catheter-associated UTI ；CAUTI)

註：

- 有症狀的泌尿道感染(SUTI) 1b和2b和其他之泌尿系統感染(OUTI)，可被定義為在監測定義的章節，但不能定義為導管相關感染。

醫療照護相關泌尿道感染-案例實務討論(EXAMPLE)

Q1

陸先生61歲診斷為脊椎T12骨折,於7/9入院行脊椎手術,有裝置導尿管於7/16拔除後解尿困難無法自解,再次重新裝置導尿管,於7/出現法燒>38度,尿液分析白血球>100個,Nitri++,Leuk++尿液培養出綠膿桿菌8000個,有沉澱物,個案是否收為UTI?

Q1基本資料			
危險因子			
實驗室結果	□ urine anlaysis	□urine culture	
判定	□ CAUTI (有FOLEY)	○ SUTI-Criterion 1a	○ SUTI-Criterion 2a
	□ CAUTI (remove FOLEY)	○ CAUTI SUTI	○ SUTI (not catheter-associated)
	□ CAUTI (無FOLEY)	○ SUTI- Criterion 1b	○SUTI- Criterion 2b
	□ SUTI in Patient ≤1 Year of Age	○ CAUTI	○ SUTI
	□ ABUTI	○ABUTI (catheter-associated)	○ABUTI (not catheter-associated)

Q2

陳先生,58歲,診斷為CVA,6/3自他院轉入,尿自解,U/A(-),6/8解尿困難,Floy留置,6/11有發燒38度,WBC12000.U/C長E.coli,>10 5,固收案為CAUTI

Q2基本資料			
危險因子			
實驗室結果	□ urine anlaysis	□urine culture	
判定	□ CAUTI (有FOLEY)	○ SUTI-Criterion 1a	○ SUTI-Criterion 2a
	□ CAUTI (remove FOLEY)	○ CAUTI SUTI	○ SUTI (not catheter-associated)
	□ CAUTI (無FOLEY)	○ SUTI- Criterion 1b	○SUTI- Criterion 2b
	□ SUTI in Patient ≤1 Year of Age	○ CAUTI	○ SUTI
	□ ABUTI	○ABUTI (catheter-associated)	○ABUTI (not catheter-associated)

Q3

個案因ICH於1/3入院手術，術後轉加護觀察治療，術後使用輔助型呼吸治療裝置及導尿管留存。於1/9陸續發燒>38.9度，進行血液、尿液常規及培養，白血球上升至17600/ul，尿液常規: WBC>100HPF，NIT:1+。血液、尿液培養出相同的致病菌，符合導尿管相關泌尿道感染監測定義收案。經抗生素治療後感染情況改善，於104/01/15轉亞急性呼吸照護病房續治療。

Q3基本資料			
危險因子			
實驗室結果	□ urine anlaysis	□urine culture	
判定	□ CAUTI (有FOLEY)	○ SUTI-Criterion 1a	○ SUTI-Criterion 2a
	□ CAUTI (remove FOLEY)	○ CAUTI SUTI	○ SUTI (not catheter-associated)
	□ CAUTI (無FOLEY)	○ SUTI- Criterion 1b	○SUTI- Criterion 2b
	□ SUTI in Patient ≤1 Year of Age	○ CAUTI	○ SUTI
	□ ABUTI	○ABUTI (catheter-associated)	○ABUTI (not catheter-associated)

Q4

陳先生,58歲,診斷為CVA,6/3自他院轉入,尿自解,U/A(-),6/8解尿困難,Floy留置,6/11有發燒38度,WBC12000.U/C長E.coli,>10 5,固收案為CAUTI

Q4基本資料			
危險因子			
實驗室結果	□ urine anlaysis	□urine culture	
判定	□ CAUTI (有FOLEY)	○ SUTI-Criterion 1a	○ SUTI-Criterion 2a
	□ CAUTI (remove FOLEY)	○ CAUTI SUTI	○ SUTI (not catheter-associated)
	□ CAUTI (無FOLEY)	○ SUTI- Criterion 1b	○SUTI- Criterion 2b
	□ SUTI in Patient ≤1 Year of Age	○ CAUTI	○ SUTI
	□ ABUTI	○ABUTI (catheter-associated)	○ABUTI (not catheter-associated)

Q5

陳先生，男，19歲

104.6/18車禍入院，診斷：Head Injury

6/19留置導尿管。

6/19尿液常規：WBC10-20/HP、Bacteria (+) 、leukocyte esterase 1+、nitrite +，未留尿液培養、耳溫38.1℃。

6 /23尿液常規：WBC 30-50/HP、Bacteria (+) 、leukocyte esterase 1+、nitrite +。耳溫38.3℃

6/23尿液培養結果：Porteus mirabilis

> 105/ml

6/23血液培養2套：Porteus mirabilis

感染部位：CAUTI

感染日期：104 年6 月23

且繼發性血流感染(感染日期為104年6月23日)

感染菌種：Escherichia coli

Q5基本資料			
危險因子			
實驗室結果	□ urine anlaysis	□urine culture	
判定	□ CAUTI (有FOLEY)	○ SUTI-Criterion 1a	○ SUTI-Criterion 2a
	□ CAUTI (remove FOLEY)	○ CAUTI SUTI	○ SUTI (not catheter-associated)
	□ CAUTI (無FOLEY)	○ SUTI- Criterion 1b	○SUTI- Criterion 2b
	□ SUTI in Patient ≤1 Year of Age	○ CAUTI	○ SUTI
	□ ABUTI	○ABUTI (catheter-associated)	○ABUTI (not catheter-associated)

Q6

陳先生，69歲，診斷：急性腎衰竭；因呼吸喘促，於4月30日入院治療

4/30：on endo 及呼吸輔助器（ventilator）使用（呼吸器設定如下）

機械通氣天數	每天最小PEEP值 (cm H2O)	每天最小氧氣濃度 (%)
1	8	1.00(100%)
2	6	0.50(50%)
3	5	0.35(35%)
4	5	0.35(35%)
5	5	0.40(40%)
6	5	0.40(40%)
7	6	0.70(70%)
8	6	0.70(70%)

5/1：血液透析

5/6-7：體溫37.0-37.8℃，WBC 13,000 cells/mm3，聽診Rhonchi，X光檢驗結果為bil infiltration，Meropenem IV（5/6-12）

請問是否符合通報條件？

Q6基本資料			
危險因子			
實驗室結果	□ urine anlaysis	□urine culture	
判定	□ CAUTI (有FOLEY)	○ SUTI-Criterion 1a	○ SUTI-Criterion 2a
	□ CAUTI (remove FOLEY)	○ CAUTI SUTI	○ SUTI (not catheter-associated)
	□ CAUTI (無FOLEY)	○ SUTI- Criterion 1b	○SUTI- Criterion 2b
	□ SUTI in Patient ≤1 Year of Age	○ CAUTI	○ SUTI
	□ ABUTI	○ABUTI (catheter-associated)	○ABUTI (not catheter-associated)

Q7

RCW病人104/8/6住院,80Kg;WBC:5330,CRP:2.57;On CVP,Endo,NG,Foley
Urine :W.B.C 30-40,urine culture:E.coli(ESBL)
Sputum culture:CRAB,Gram's stain:G(+) Bacilli (++),G(-) Bacilli(++);Chest X ray:
Chronic obstructive pulmonary disease,bil. with secondary infectious process of right and left lower lungs are identified.
Tip culture:Klebsiella ozaenae,Glucose-nonfermenting G(-)Bacilli;
Anti:Tienam250mg IV 8/6-8/26
問題:8/21Urine W.B.C:Over 100 /HPF ,Candida albicans>1.0X10^5/mL
,BR:WBC6960,Neutrophils Seg73.7%算UTI?
8/14Chest X ray:Pleural effusion, bilateral.
8/17Chest X ray:Pulmonary infectious infiltration of both lower lungs

Q7基本資料			
危險因子			
實驗室結果	□ urine anlaysis	□urine culture	
判定	□ CAUTI (有FOLEY)	○ SUTI-Criterion 1a	○ SUTI-Criterion 2a
	□ CAUTI (remove FOLEY)	○ CAUTI SUTI	○ SUTI (not catheter-associated)
	□ CAUTI (無FOLEY)	○ SUTI- Criterion 1b	○SUTI- Criterion 2b
	□ SUTI in Patient ≤1 Year of Age	○ CAUTI	○ SUTI
	□ ABUTI	○ABUTI (catheter-associated)	○ABUTI (not catheter-associated)

Q8

吳女士，75歲，診斷：胃體部惡性腫瘤，5/7入院

6/11發燒38.2度

5/13 Urine/C：Candida tropicalis

5/18 Urine/C：Enterococcus spp

6/11 U/A：WBC>100/HPF

on foley6/7~6/13

6/11 Urine/C：Pseudomonas aeruginosa>105 CFU/ml

Q8基本資料			
危險因子			
實驗室結果	□ urine anlaysis	□urine culture	
判定	□ CAUTI (有FOLEY)	○ SUTI-Criterion 1a	○ SUTI-Criterion 2a
	□ CAUTI (remove FOLEY)	○ CAUTI SUTI	○ SUTI (not catheter-associated)
	□ CAUTI (無FOLEY)	○ SUTI- Criterion 1b	○SUTI- Criterion 2b
	□ SUTI in Patient ≤1 Year of Age	○ CAUTI	○ SUTI
	□ ABUTI	○ABUTI (catheter-associated)	○ABUTI (not catheter-associated)

Q9

女，71歲，診斷：Acute respiratory failure

7/26：入院日

有使用導尿管，使用期間為7/28-8/6

7/26 U/A Normal

8/3 病人開始發燒至39.2℃

8/5 U/A WBC esterase：3+，WBC>100/HPF，Yeast：positive

8/5 U/C 有長Candida albicans>10 5 CFU/ml

醫師診斷泌尿道感染

此病患是否可以收案院UTI感染？

Q9基本資料			
危險因子			
實驗室結果	□ urine anlaysis	□urine culture	
判定	□ CAUTI (有FOLEY)	○ SUTI-Criterion 1a	○ SUTI-Criterion 2a
	□ CAUTI (remove FOLEY)	○ CAUTI SUTI	○ SUTI (not catheter-associated)
	□ CAUTI (無FOLEY)	○ SUTI- Criterion 1b	○SUTI- Criterion 2b
	□ SUTI in Patient ≤1 Year of Age	○ CAUTI	○ SUTI
	□ ABUTI	○ABUTI (catheter-associated)	○ABUTI (not catheter-associated)

Q10

病患於104.07.12開始有發燒情形，體溫38.1度，07.14予ICP U/A :WBC 30-35,Bacteria ++,nitrate(-),leukocyte esterase(+),104.07.14 u/c :proteus mirabilis.Klebsiella pneumoneae.

Q10基本資料			
危險因子			
實驗室結果	□ urine anlaysis	□urine culture	
判定	□ CAUTI (有FOLEY)	○ SUTI-Criterion 1a	○ SUTI-Criterion 2a
	□ CAUTI (remove FOLEY)	○ CAUTI SUTI	○ SUTI (not catheter-associated)
	□ CAUTI (無FOLEY)	○ SUTI- Criterion 1b	○SUTI- Criterion 2b
	□ SUTI in Patient ≤1 Year of Age	○ CAUTI	○ SUTI
	□ ABUTI	○ABUTI (catheter-associated)	○ABUTI (not catheter-associated)

Q11

紀*華，61歲，診斷：思覺失調症

12/30入住精神科病房，(於12/11因解尿困難於內科病房ON FOLEY)

1/6：發燒38.2℃，尿液報告顯示:Appearance 1+、Ketonebody 1+、Occult Blood 3+、Nitrate +、Leucocyte Esterase 3+、WBC >100、RBC >100、Bacteria 4+。尿意培養為Escherichia coli，故是收UTI-SUTI於精神科病房？

Q11基本資料			
危險因子			
實驗室結果	□ urine anlaysis	□urine culture	
判定	□ CAUTI (有FOLEY)	○ SUTI-Criterion 1a	○ SUTI-Criterion 2a
	□ CAUTI (remove FOLEY)	○ CAUTI SUTI	○ SUTI (not catheter-associated)
	□ CAUTI (無FOLEY)	○ SUTI- Criterion 1b	○SUTI- Criterion 2b
	□ SUTI in Patient ≤1 Year of Age	○ CAUTI	○ SUTI
	□ ABUTI	○ABUTI (catheter-associated)	○ABUTI (not catheter-associated)

Q13

劉小姐，88歲，診斷 閉鎖性骨折

104.07.17 滑倒地上，右上肢、右腰、右髖、右大腿疼痛，至急診求治，

F/U Pelvis + R't Hip Joint Lat,R't Humerus Ap &Lat、R't Femur AP & Lat:ITF, RIGHT，Consult骨科，建議住院手術。

104.07.18 手術

104.07.20 10:00 Hb:9.3 輸注packed RBC 2 unit

10:20 耳溫37.6

11:48 左側太陽穴、左手背及左頸後出現紅疹及水腫，無血氧使用，血氧濃度為89-90%

13:15 耳溫38.3℃ 脈搏:127次/分 呼吸:20次/分 BP:161 /78 mmHg

14:12 留Catheter urine Culture,Blood Culture* 並 開立CefMeTaZole(喜達隆)1g/Vial (1Vl)[1g].IVD.Q12H藥物治療，

104.07.20 Leukocyte esterase: 3+ RBC: >1000 * /uL

WBC: 271 * /uL

Bacteria: - /HPF

104.07.23 Catheter urine Culture

Pseudomonas aeruginosa Colony count : >100000 CFU/ml

Proteus vulgaris Colony count : >100000 CFU/ml

104.07.26 Blood Culture Blood culture no growth for 6 days

請問是否有符合UTI收案定義?

Q12基本資料			
危險因子			
實驗室結果	□ urine anlaysis	□urine culture	
判定	□ CAUTI (有FOLEY)	○ SUTI-Criterion 1a	○ SUTI-Criterion 2a
	□ CAUTI (remove FOLEY)	○ CAUTI SUTI	○ SUTI (not catheter-associated)
	□ CAUTI (無FOLEY)	○ SUTI- Criterion 1b	○SUTI- Criterion 2b
	□ SUTI in Patient ≤1 Year of Age	○ CAUTI	○ SUTI
	□ ABUTI	○ABUTI (catheter-associated)	○ABUTI (not catheter-associated)

感染病房歸屬(Location of attribution)：

- 當住院病人同時符合泌尿道感染收案標準的日期為感染日期，其所在的病房位置即為感染病房歸屬(除非有以下例外)

感染歸屬原則(*Transfer Rule*)

- 在同一機構內由某一病房轉到另一個病房或另一個新機構(如轉的當天或隔天)2天內符合泌尿道感染收案標準則感染病房可歸屬於原轉出單位。

- 被轉入的單位應該將符合醫療照護相關感染個案轉知原轉出單位且要通報至美國疾病預防控制中心的全國醫療照護安全網(NHSN)。這個稱為感染歸屬原則(***Transfer Rule***)，舉例說明如下

參考資料

1. Magill SS, Hellinger W, et al. Prevalence of healthcare-associated infections in acute care facilities. Infect Control Hosp Epidemiol. 2012;33:283-91.
2. Scott Rd. The Direct Medical Costs of Healthcare-Associated Infections in U.S. Hospitals and the Benefits of Prevention, 2009. Division of Healthcare Quality Promotion, National Center for Preparedness, Detection, and Control of Infectious Diseases, Coordinating Center for Infectious Diseases, Centers for Disease Control and Prevention, February 2009.
3. Klevens RM, Edward JR, et al. Estimating health care-associated infections and deaths in U.S. hospitals, 2002. Public Health Reports 2007;122:160-166.
4. Gould CV, Umscheid CA, Agarwal RK, Kuntz G, Pegues DA. Guideline for prevention of catheter-associated urinary tract infections 2009. Infect Control Hosp Epidemiol. 2010;31:319-26.
5. Dudeck MA, Horan TC, Peterson KD, et al. National Healthcare Safety Network (NHSN) report, data summary for 2009, device-associated module, issued January 2011. Am J Infect Control 2011;39:349-67