



Peran Pemeriksaan Mikrobiologi Untuk Menunjang Pemakaian Antibiotik Rasional di RS

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Common Infections Can Lead to Trouble

Among adults with sepsis
in CDC study:



Had a lung infection



Had a UTI
(e.g., kidney
infection)



Had a GI infection



Had a skin infection

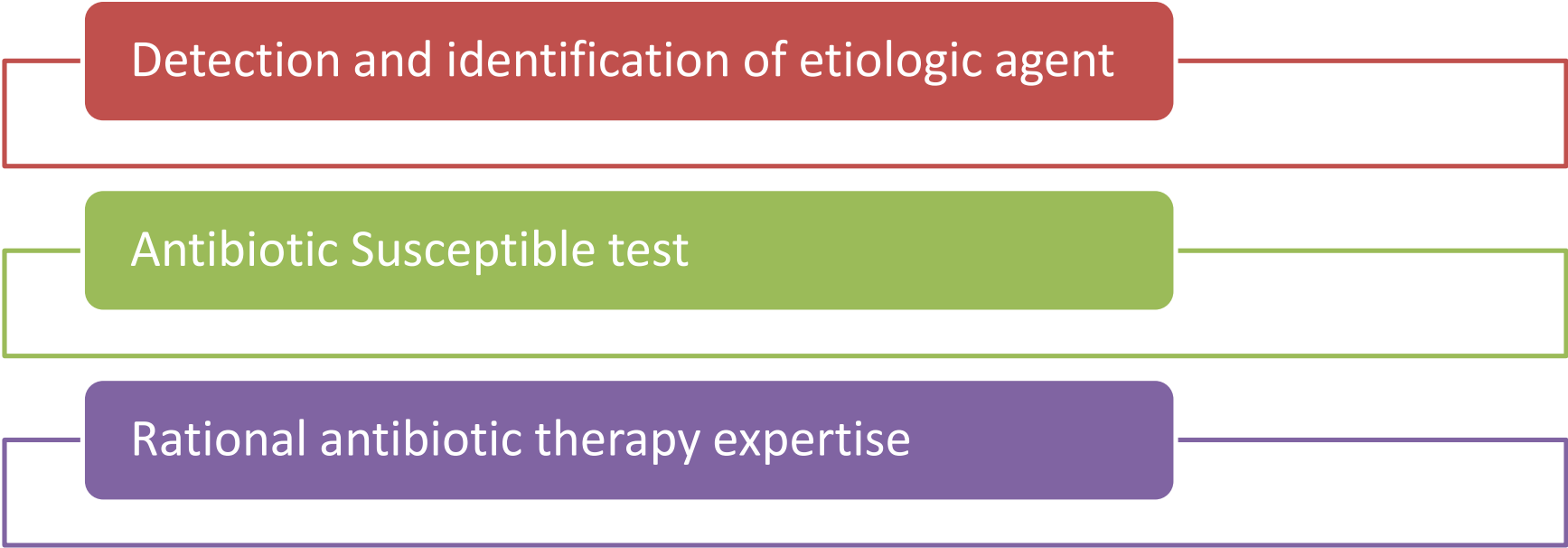
Source: CDC Vital Signs, August 2016.
UTI, urinary tract infection;
GI, gastrointestinal

Microbiology Laboratory Examination:

Towards precision medicine in infection

Precision medicine provides an opportunity to improve the outcomes of patients with infection

The aim of microbiology examination:



Detection and identification of etiologic agent

Antibiotic Susceptible test

Rational antibiotic therapy expertise

Pemanfaatan pemeriksaan Mikrobiologi

Sebelum ada hasil
Pemeriksaan Mikrobiologi

- Terapi Empirik
- Berdasar data pola kuman

Setelah ada hasil
pemeriksaan
mikrobiologi

- De-eskalasi
- Terapi definitif

Tahapan pemeriksaan Mikrobiologi

Pre-analytic

- Pengambilan sampel
- Pengiriman/ penyimpanan sampel

Analytic

- Direct microscopic preparat
- Kultur dan uji AST
- Molecular

Post-analytic

- Interpretasi hasil
- Pelaporan hasil ke klinisi

Pre-analytical process

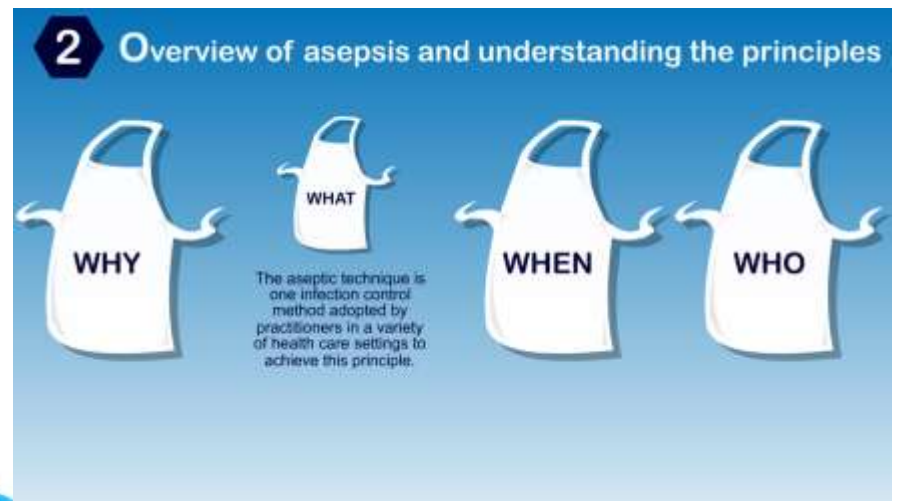
- Aseptic
- Accuracy sample choice
- Adequate volume

Problems with aseptic technique

- No standard
- Poor equipment choices
- Poor understanding of asepsis
- A historical & unhelpful paradigm
- Poor hand cleaning
- Ritual based practice
- Confusion & ambiguity







Jenis Kultur

Aerob dan/atau anaerob

- Aspirat cairan/ pus tertutup
- Darah
- Sumsum tulang
- Pus dari operasi
- Jaringan
- Urin pengambilan suprapubik

Hanya bisa aerob

- Aspirat endotracheal
- swab tenggorok/nasofaring
- Swab ulcus terbuka
- Sputum
- Feces
- Urin tampung/ kateter

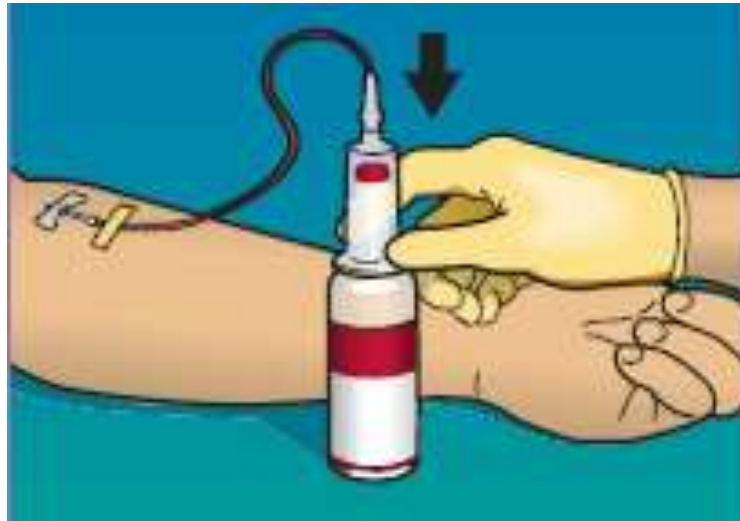
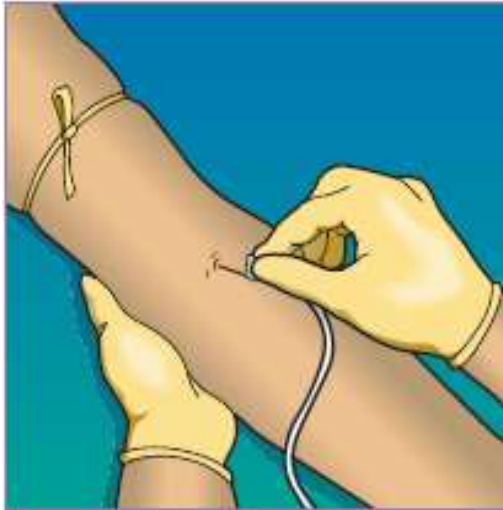
DARAH

- Diagnosis bakteremia dan fungemia
- Hasil (+) → menegaskan etiologi infeksi pada penyakit pasien
- Agen penyebab diketahui → optimalisasi terapi dan informasi prognosis
- **Kontaminasi → kesalahan interpretasi**
- Volume darah → kemampuan menangkap mikroorganisme dalam darah

Aseptik

- Sarung tangan steril
- Desinfeksi kulit:
- alkohol 70%, povidone iodine, chlorhexidine
- Dari central ke perifer
- Biarkan mengering terlebih dahulu
- Alkohol → 1 menit
- Iodine/ chlorhexidine → 2 menit
- Jangan disentuh lagi





waktu

- Saat demam
- Sebelum mendapat antibiotik (jika memungkinkan)
- Sesaat sebelum pemberian antibiotik berikutnya

Lokasi

- Vena perifer, kanan-kiri
- Lines yg sudah terpasang + vena perifer
- Ujung kateter + vena perifer

Volume Darah untuk Pemeriksaan Kultur

Weight of Patient (kg)	Total Patient Blood Volume (mL)	Recommended Volume of Blood for Culture (mL)		Total Volume for Culture (mL)	% of Total Blood Volume
		Culture Set No. 1	Culture Set No. 2		
≤1	50–99	2	...	2	4
1.1–2	100–200	2	2	4	4
2.1–12.7	>200	4	2	6	3
12.8–36.3	>800	10	10	20	2.5
>36.3	>2200	20–30	20–30	40–60	1.8–2.7

When 10 mL of blood or less is collected, it should be inoculated into a single aerobic blood culture bottle.

IDSA guidelines 2013

Increased volume

10 ml → 20 ml

20 ml → 30 ml

Increased Yield

30 % → 40 %

10 % → 15 %

NOTE: Pediatric volume guide: usually draw 1 mL/year of age.

Isenberg Clinical Microbiology Procedures Handbook. 2007

Volume

Dewasa: 2 buah, @ 10 ml

Anak dengan bakteremia: ambil 2 buah, @ 1-5 ml

PENGAMBILAN SPESIMEN

Aseptik

Desinfeksi tempat pengambilan

Volume darah cukup

Waktu: Saat Demam

Isenberg Clinical Microbiology Procedures Handbook. 2007

How many bottles?

- 1 blood culture is rarely, if ever, sufficient or advisable.
 - *A positive result on a single culture is difficult to interpret, unless an unequivocal pathogen is isolated.*
- 2 blood cultures are usually adequate when continuous bacteraemia is anticipated
- 3 blood cultures are reasonable when intermittent bacteraemia is suspected

Diambil pd 2 sisi berbeda (Clin Microbiol. Rev19:788-802, 2006)

Jumlah volume darah sangat menentukan hasil

Waktu bakteremia (penting)

2 kultur diambil dari vena dan kateter :

- Keduanya vena (PPV 98 %)
- Keduanya kateter (PPV 50 %)
- Satu vena, satu kateter (PPV 96 %)



- ✓ Remove the cap and disinfect the septum with an alcohol swab and allow to dry. Do not use iodine as it may damage the septum.
- ✓ Remember to hold the needle down onto the vial

Timing

- The ideal: ranging from one to several hours
 - 2 separate sites within minutes of each other from patients who are acutely ill or those in whom the likelihood of continuous bacteraemia is high
- Intermittent bacteraemia:
 - multiple blood cultures 6 - 36 hours apart

- Pemeriksaan biakan ujung CVC hanya dilakukan bersamaan dgn darah vena
- Indikasi: sepsis
- Jika: ujung CVC = biakan darah □ CVC sbg sumber

URIN

- **Pemeriksaan semikuantitatif**
- **Sampel:**
 - *Mid stream urine (Clean catch urine, urin porsi tengah)*
 - *Supra pubic puncture* - terutama kultur anaerob
 - Urin kateter
- **Transport :**
 - Dalam 2 jam, suhu ruang
 - > 2 jam : lemari es 4°C (bukan *freezer*)

SALURAN NAPAS BAWAH

- SPUTUM
 - Bukan saliva
 - Wadah steril



Fig. 74 "Sputum" specimen composed of saliva (left). Purulent sputum specimen (right).

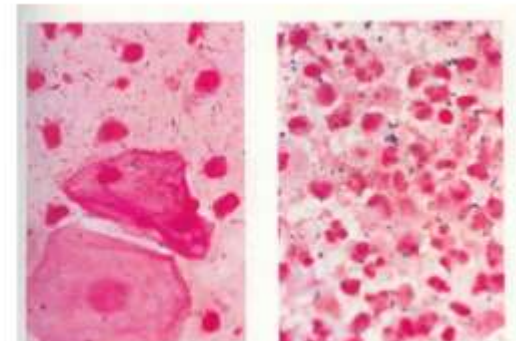


Fig. 75 Gram stain of sputum smear with many neutrophil polymorphs and some epithelial cells.

Fig. 76 Gram-positive diplococci in sputum smear, suggestive of *S. pneumoniae*.

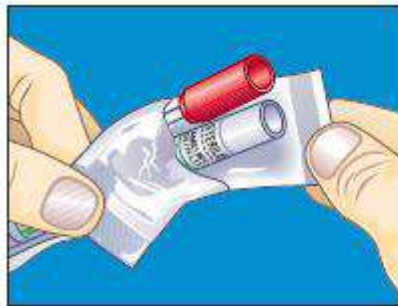
Sputum

- Sputum dikeluarkan secara spontan / Induksi
- Sputum dari endotrakheal melalui mucus extractor atau double lumen suction
- TIDAK dapat digunakan potongan ujung selang

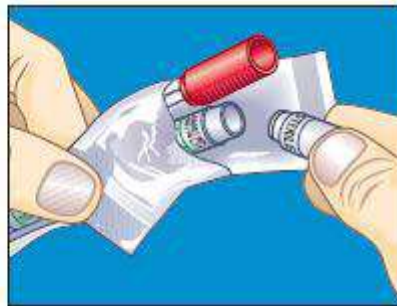


LUKA / ABSES

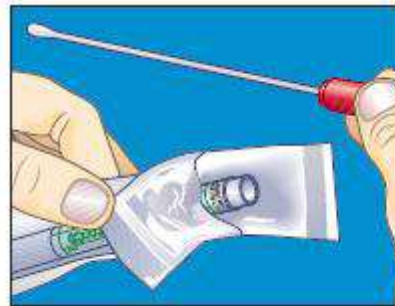
- Cara : biopsi (terbaik), aspirasi, dan swab
- Anaerob : biopsi dan aspirasi
- Aspirasi untuk :
 - Abses tertutup
- Swab :
 - Pus diluar dibersihkan dgn PZ
 - Ambil spesimen dasar ulkus dgn swab
- *Tidak dianjurkan untuk mengambil pus yang berasal dari drain*



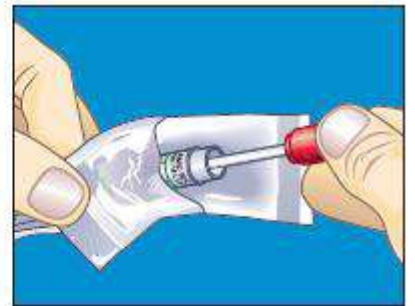
Peel apart the plastic film layers



Remove plug from transport tube



Remove swab and collect specimen



Insert swab in tube and close cap



LABEL

- Identitas penderita: Nama, Umur, Jenis Kelamin
- Jenis permintaan pemeriksaan/ biakan
- Jam dan tanggal pengambilan spesimen
- Jika sampel lebih dari satu pada tiap penderita, misal tiga spesimen, beri tanda: '1 dari 3', '2 dari 3', 3 dari 3'



Thank You