

**In the light of the Case series published-**  
**Nocardia infection causing non-healing surgical**  
**wounds: A case series from Bangladesh**

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# Evidence Based Practice

**is the idea that occupational practices ought to be based on scientific research**

## **Criteria of for EBM or EBP**

Clinical expertise/expert opinion

Evidence (external or internal)

Client/patient or/caregiver perspective

<https://www.asha.org/research/ebp>

Father of early modern medicine--Ibne Sina

Father of evidence based medicine– Archie Cochrane

## Evidence-Based Practice (EBP)



“Evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research.”

Sackett et al., 1996



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# Nocardia infection causing non-healing surgical wounds: A case series from Bangladesh

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## Highlights



18





# Louis Pasteur (1822-1895)-Father of Microbiology



*In the field of observation, chance favours only the prepared mind.*

*Louis Pasteur*

The Journey of Nocardia detection started in 2016 – A **Vision** from a great surgeon Late Prof. A. A. Ashraf Ali and the **Mission** taken by the Microbiology Department



- A Nocardiosis case- **Which door to knock?**

# Published in 2017

The screenshot shows a web browser with two tabs: 'Chronic skin and lung infection' and 'SE Detection of Nocardia from Chro...'. The address bar shows 'pubs.sciepub.com/ajidm/5/2/2/'. The page header includes the SciEP logo and navigation links: Home, Journals, Articles, Special Issues, Books, Conferences, News. On the right, there are icons for Search, Login, and E-alert.

The journal title is 'American Journal of Infectious Diseases and Microbiology', Volume 5, 2017 - Issue 2. The website is 'http://www.sciepub.com/journal/ajidm'. There are buttons for 'Quick Submission', 'Back to Journal', and 'Rss Feed'. A search bar contains the text 'Enter keywords, authors, DOI etc.'.

The article title is 'Detection of Nocardia from Chronic Skin and Lung Infections in Bangladeshi Patients' by Afzalunnessa Binte Lutfor, Ritu Saha, Arpita Deb, Asif Mujtaba Mahmud, Abu Ahmed Ashraf Ali, Tasmin Haque, Sadia Rahman, Nadia Sharmin Shorno, Amina Arafat. It is a Research Article, Open Access, and Peer-reviewed. The journal is 'American Journal of Infectious Diseases and Microbiology', 2017, 5(2), 80-86. DOI: 10.12691/ajidm-5-2-2. Published online: May 10, 2017.

Keywords: chronic skin infection, discharging sinus, Nocardia, non healing wound, primary cutaneous nocardiosis.

On the right, there is a table with statistics: 19863 Saves, 0 Citations, 21497 Views, 8 Likes. Below it is a 'Like this article(8)' button and a 'Share' section with social media icons for Google+, Facebook, Twitter, LinkedIn, CiteULike, and Mendeley.

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## American Journal of Infectious Diseases and Microbiology

Volume 5, 2017 - Issue 2

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## Detection of Nocardia from Chronic Skin and Lung Infections in Bangladeshi Patients

Afzalunnessa Binte Lutfor<sup>\*</sup>, Ritu Saha, Arpita Deb, Asif Mujtaba Mahmud, Abu Ahmed Ashraf Ali, Tasmin Haque, Sadia Rahman, Nadia Sharmin Shorno, Amina Arafat

*American Journal of Infectious Diseases and Microbiology*. 2017, 5(2), 80-86. DOI: 10.12691/ajidm-5-2-2

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Both diagnostic services and clinical practice depends on observation at the beginning





# Dependency of the Laboratory Division and our expectations

## Depends on

- Doctors who caters direct service to patients
- Patients who voluntarily collect and supply
- Receptionist/Phlebotomist who receives or collects sample

## Our Expectations


- Proper request
- Additional request
- Correct samples
- Authentic samples so that does not fall into the “sample rejection” criteria

i.e., swab/pus/discharge  
not tissue in formalin

# Background

- *Nocardia* can be introduced **accidentally** or by **unhygienic** habit leading to non-healing surgical wounds. It should not be an endogenous source.
- This is enigmatic for clinicians and troublesome for patients because of **festering** infections for months or years as **culture needs >5 days or extended incubation and treatment needs >6 months antibiotic– both of which exceptional.**
- With timely diagnosis and by appropriate treatment, *Nocardiosis* can be **cured**.
- Delayed or missed diagnosis can lead to the development of **antimicrobial resistance**.

# Objectives



Eliminate  
diagnostic  
dilemma



Disseminate to  
the doctors



Treatment before  
unwanted delay

# Methodology

- All patients were **referred** to the Microbiology Laboratory of AWMCH and different hospitals or labs of Dhaka and other districts.
- Detailed **history** with cell **phone** noted.
- **Antibiotic withdrawn** 3-7 days before sample collection
- Samples from wounds were **collected** in the laboratory under supervision.
- *Nocardia* identification and susceptibility testing were carried out by standard procedure with a little twist or in house **adaptation** for the extended culture.



# Special measures taken in diagnosing Nocardia spp.

- Referred **selective** cases
- History **suggestive**
- Antibiotic **discontinued**
- Sample taken at the **lab**
- **Multiple** sample and multiple staining, culture
- **Extended** culture with special care to prevent drying and contamination
- Call to collect report as may take **7-10** days
- **Feedback** from the patient regarding treatment and recovery through phone or app to collect pictures.

## Case summary:

**Mrs. X**, 26 year old, normotensive, a graduate from Uttara presented with the complaints of -

- Chronic ulcer on abdominal scar for 11 months.

She stated that she had elective LUCS in 2020. After 15 days since the surgery she developed infection on wound site and was given antibiotic according to wound culture. But despite repeated courses of antibiotics for 6 months, wound was not healing. Then six months back, she was diagnosed with skin TB and sinus formation in the wound site. Sinectomy was done and was given modified CAT-1 regimen with moxifloxacin. As the wound still persists, she was referred to pulmonologist for further management.

She had a H/O incomplete abortion in 2019 due to maternal Rubella and CMV infection and had developed gestational diabetes and Covid-19 during pregnancy.

On general examination: Pulse 90/min, BP 90/60 mm of Hg, Temp – normal, SaO<sub>2</sub> – 97% without Oxygen, six min walk test: No desaturation, weight 65 kg, Respiratory system examination: normal

Wound: multiple non healing ulcer, irregular margin, with discharge from some lesions

Family history:	NAD
Personal history:	Nothing significant
Socioeconomic history:	middle class
Occupation:	Private employee (desk job)
Travel H/O:	NAD
Exposure H/O:	NAD
Previous illness:	Maternal Rubella, HSV-1, Rubella infection in 2019, Covid-19 in 2020, gestational diabetes
H.O allergy:	NAD
Smoking History	Non-smoker
ongoing Treatment	
Previous treatment	Extended CAT-1 regimen for 9 months, Clindamicin, flucloxacillin



# Diagnosis- based on 3 criteria

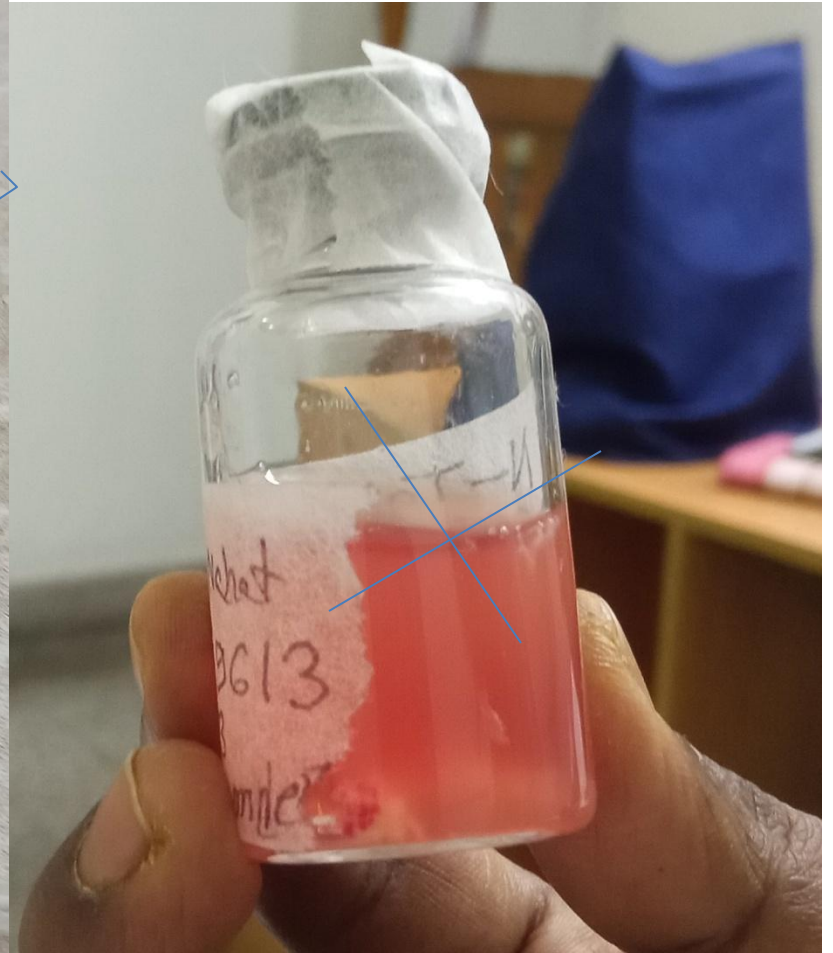
Gram stain  
MZN stain  
ZN stain  
Culture



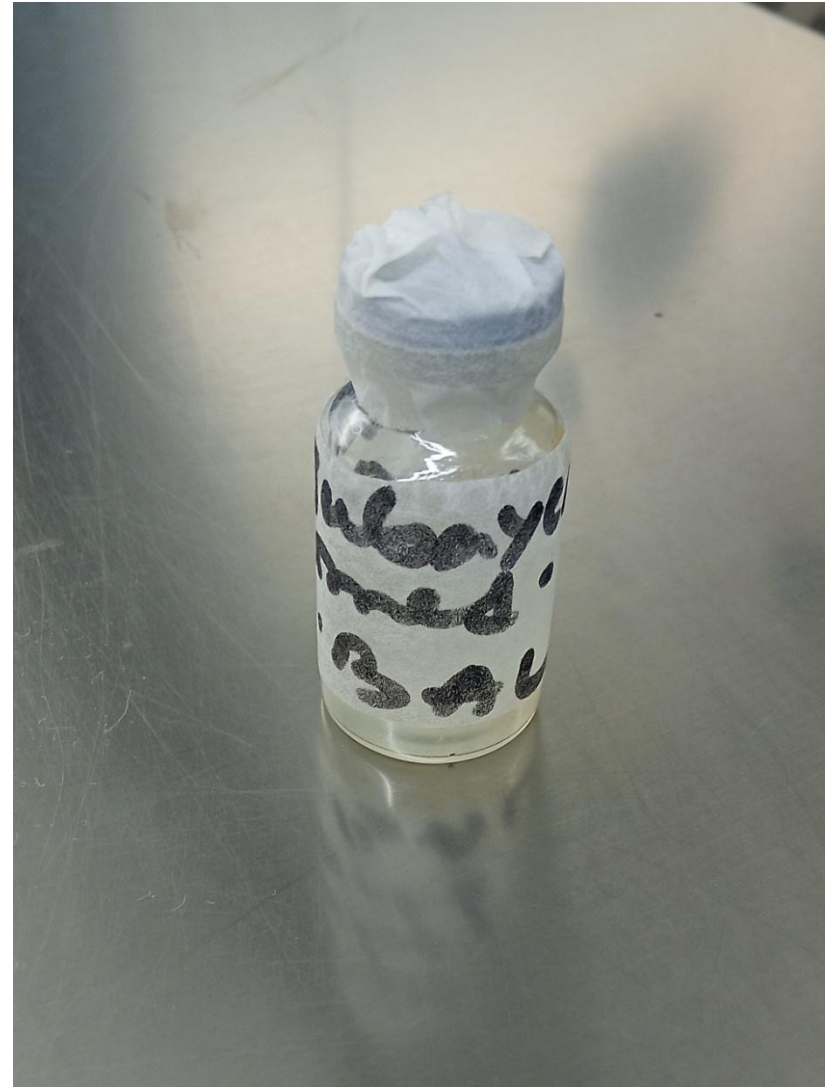
1. Growth positive plus
2. One Gram stain and
3. One MZN stain must have positive findings



# Unavoidable-Sample rejection



Acknowledgement: Technicians, & doctors for kindly collecting samples and detailed history taking



# Sample collection-points to ponder

**Beware of super added infected condition**



**Discontinue before collection  
Antibiotic for 4 days and  
Anti TB drugs for 7 days– Ref.:  
Afzalunnessa et al., *American Journal of  
Infectious Diseases and Microbiology*,  
2017, Vol. 5, No. 2, 80-86**





# Methodology

- Detailed History
- Histopathology /PCR report
- Sample
- Gram stain
- ZN stain
- MZN stain
- Culture
- Subculture
- Sensitivity
- Storage

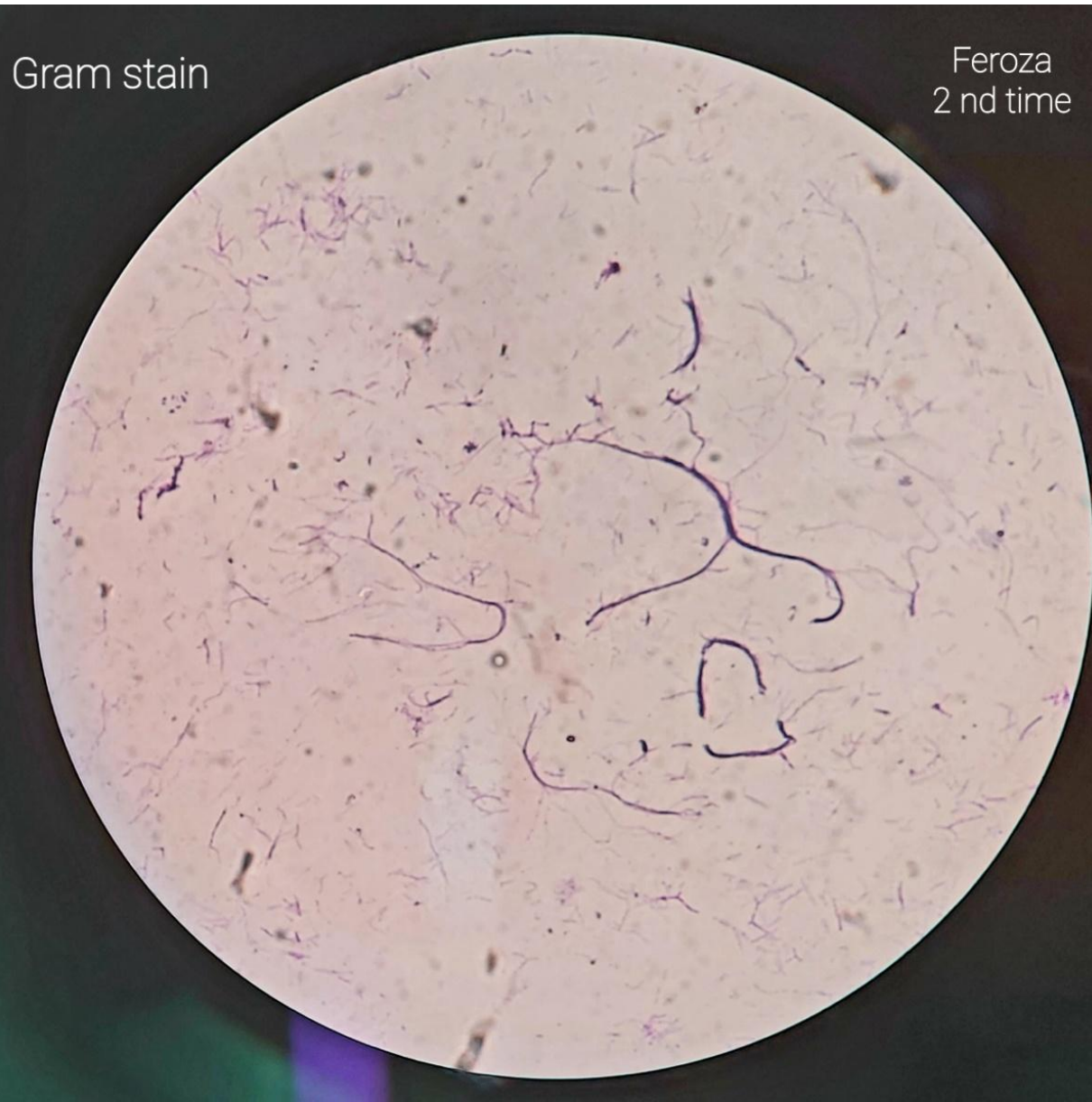


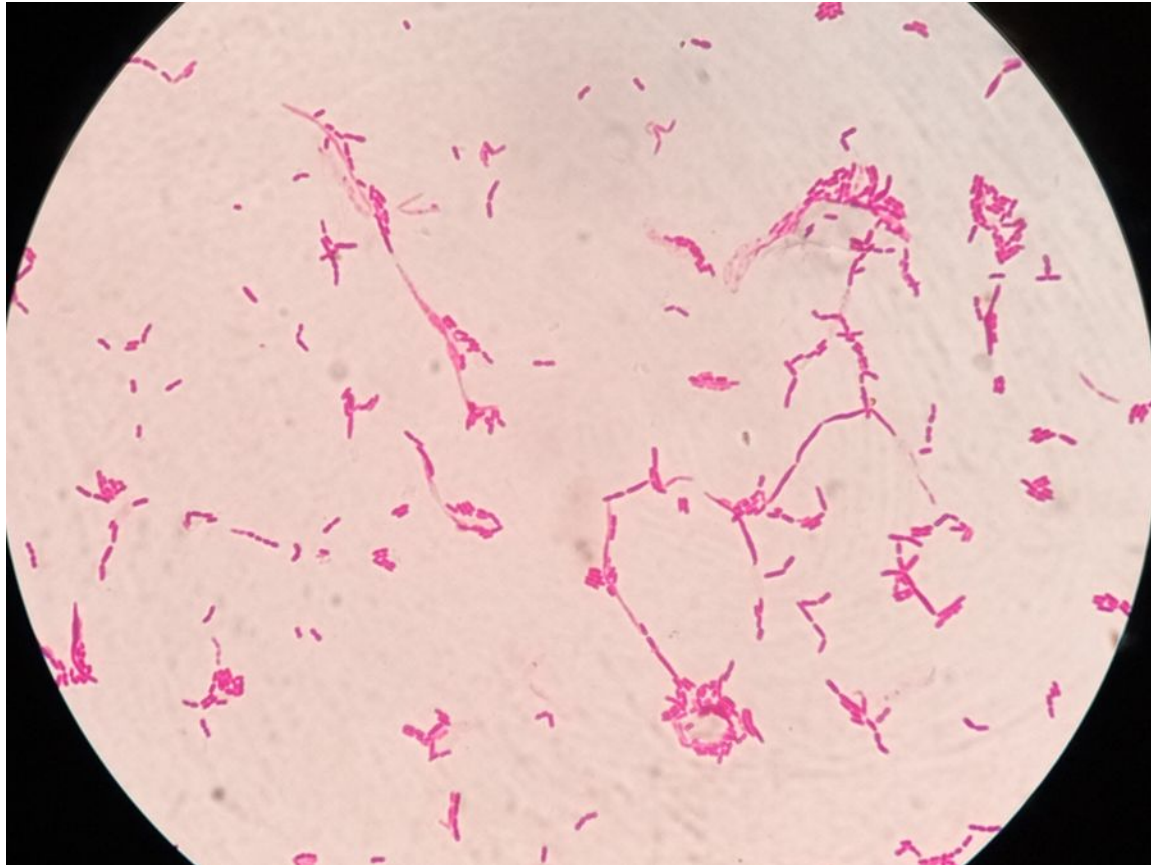


# Prevent drying and contamination



# Gram positive filaments in cocco-bacillary form





**Findings on MZN stain of  
primary culture, like this**

**Makes your day**



**Finding this on MZN stain**





## Microscopy-a tedious relentless search

- Gram staining
- Ziehl-Neelsen staining
- Modified ZN staining-3%  
Sulphuric acid



# Variations in growth of Nocardia



Science and Education Publishing  
From Scientific Research to Knowledge

Growth of *Nocardia* spp. on Blood Agar plate



Ma Binte Lutfur et al. Detection of *Nocardia* from Chronic Skin and Lung Infections in Bangladesh. *Journal of Infectious Diseases and Microbiology*, 2017, Vol. 5, No. 2, 80-86. doi:10.12673/jidm.v5i2.126

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Pick up the right  
colony from mixed  
growth

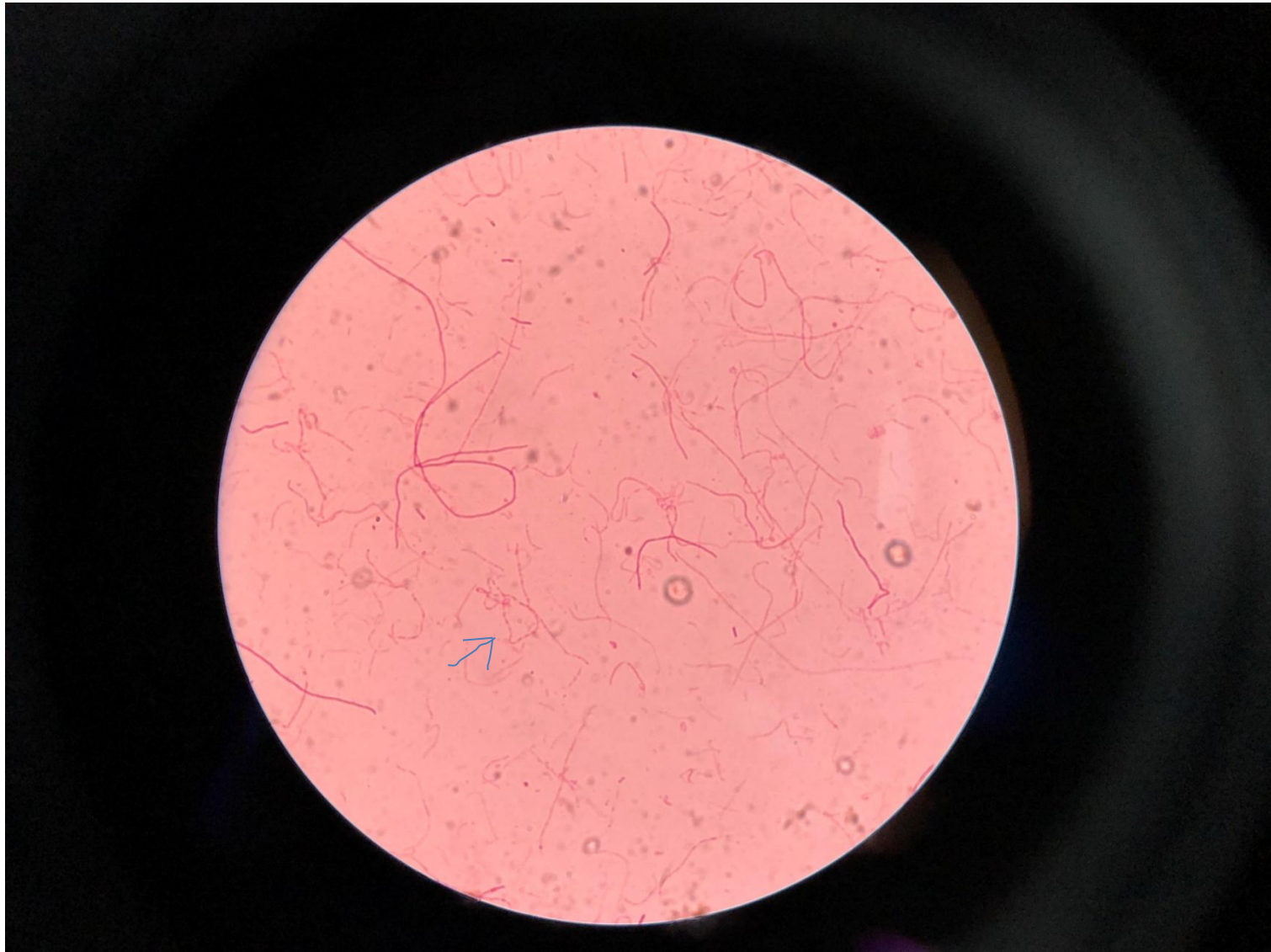


Suspected colony grown  
after 3 days incubation





# Acid fast bacilli in cocco-bacillary form



## Patient 11

A woman aged 56 years came with discharging as well as healed sinuses on the abdominal wall ([image8](#)). She underwent a hysterectomy and after the operation, her wound never healed. For one and a half years, she was treated with multiple antibiotics, antifungal and even anti-tubercular drugs. *Nocardia* spp. was isolated from the sinus above the stitch area and the patient was cured with co-trimoxazole taken for one year.

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## Patient 7

A 60-year-old male presented with a few discharging sinuses following exploratory surgery on a nodule in the right infra-mammary region ([image5](#)). Culture of pus from the discharging sinus was identified as *Nocardia* spp. Doxycycline was given according to susceptibility pattern for 12 months, and the patient was cured.

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Figure 5. Few discharging sinuses which developed following exploratory surgery on a nodule in the right inframammary region of a 60-year-old businessman.

A case of RTA, taken antibiotic, antifungal, anti-TB drugs  
but after diagnosis of Nocardiosis  
cured with doxycycline taken for a year



**Afzalunnessa et al., *International Journal of Infectious Diseases*  
110 (2021) 272-278.**

<https://doi.org/10.1016/j.ijid.2021.07.028>







**Figure 11.** A 35-year-old businessman presented with a swelling in the left sub-mandibular region with multiple sinuses around the swelling.



**Figure 12.** Multiple discharging sinuses are visible around the appendectomy incision of a 36-year-old female.

treatment for 3 months without much improvement. *Burkholderia pseudomallei* was identified from the pus at the base of the swelling and culture from the discharging sinus near the chin found *Nocardia* spp. He was given 14 days of ceftriaxone for *Burkholderia pseudomallei* and 6 months of doxycycline for *Nocardia* spp. The patient noticed remarkable improvement after six months and is still under antimicrobial therapy.

The only immunocompromised patient- a child with X-linked agammaglobulinemia



# More cases



**Figure 3.** A discharging sinus on the right side of neck in a 32-year-old male banker is visible along with scars of some healed sinuses.



**Figure 4.** Anterior abdominal wall of a 47-year-old female shows a non-healing wound above the scar of herniotomy and hernioplasty operation.



**Figure 6.** Lower abdominal wall of a 30-year-old female showing a discharging sinus above the horizontal incision for lower uterine caesarian section.



**Figure 7.** Lower abdominal wall of a 34-year-old female showing a discharging sinus above the horizontal incision for lower uterine caesarian section. Some suture material is still visible.



# Development of infection after surgical procedure-a thought provoking issue for the Microbiologist-IPC team?

H/O laparoscopic surgery with port infection



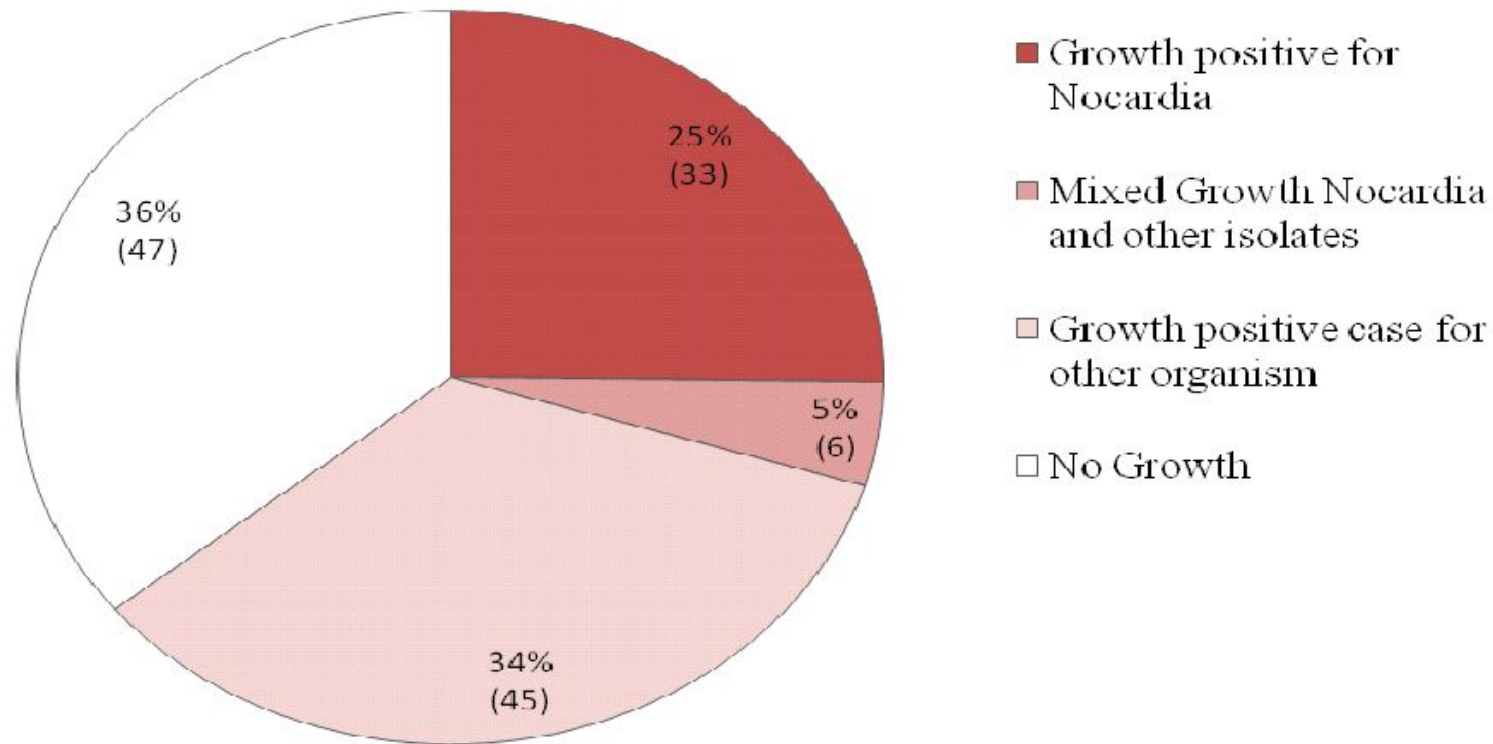
H/O surgery with emerging sinuses and healed marks around



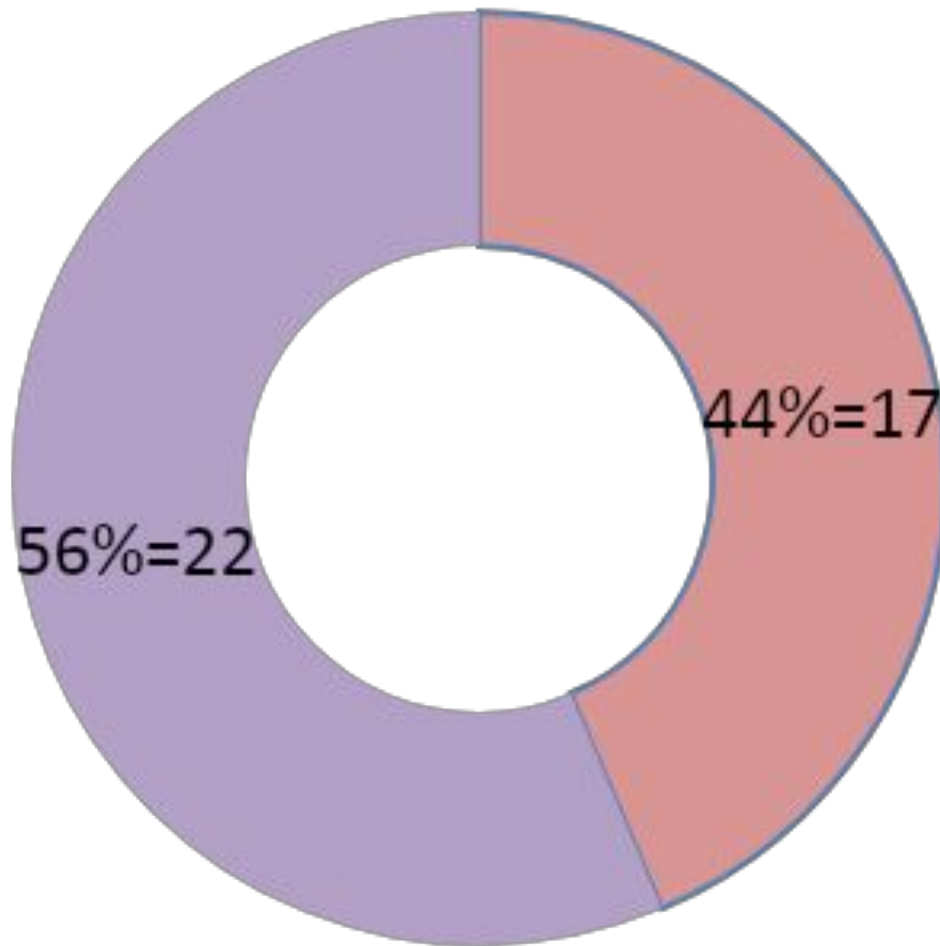


# Results (2016 to 2020)

Among total referred cases (131), 39 (33+6) *Nocardia* spp.

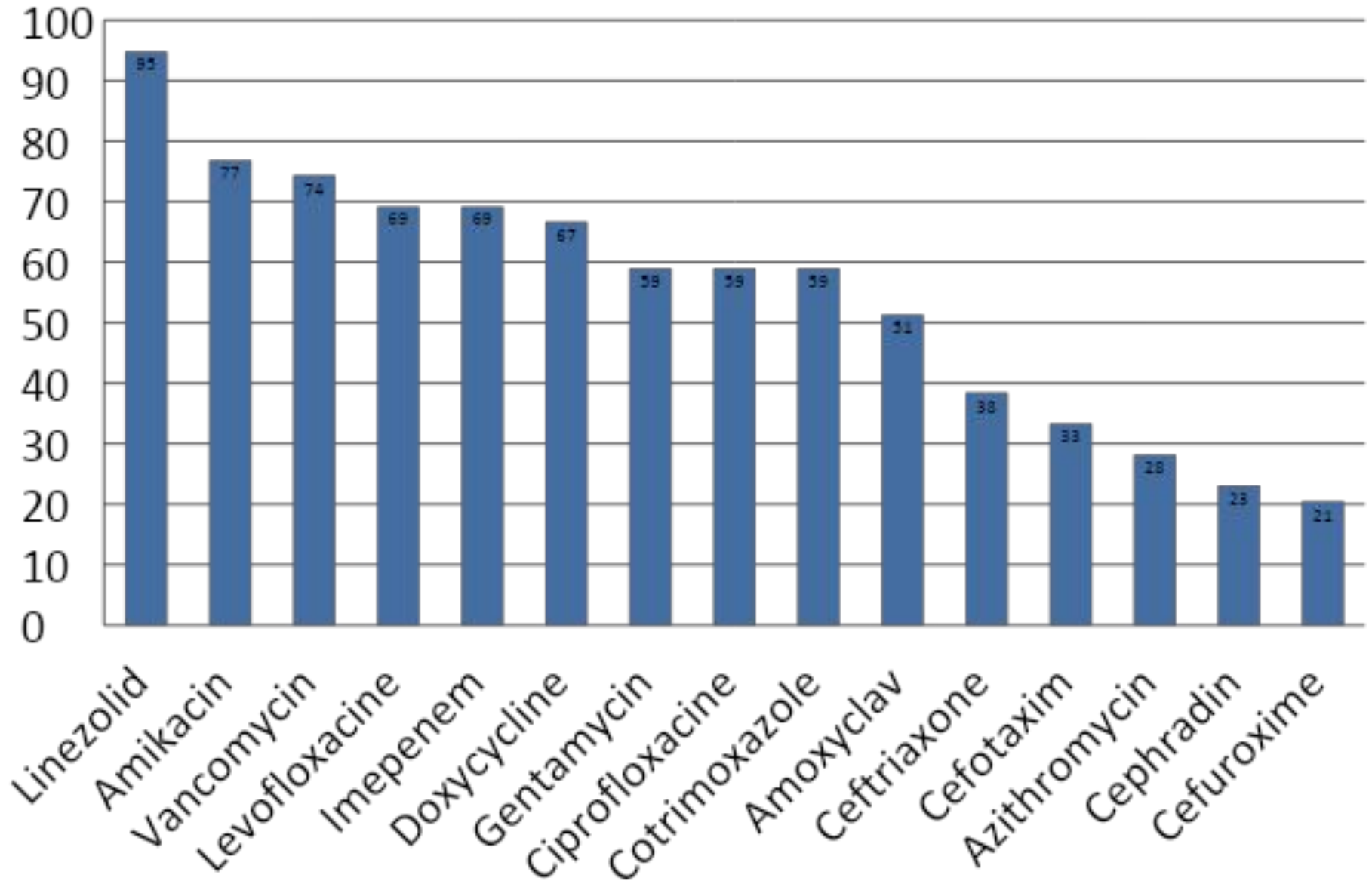


Among total 39 Nocardiosis cases, 17 (44%) have been prescribed or taken anti-TB drugs



- Suspected TB or having antitubercular drug = 17
- Not having antitubercular drug = 22

# Sensitivity pattern of *Nocardia* Spp.



Identifying *Nocardia* spp.  
-challenging but not impossible

Nothing is impossible,  
the word itself says  
**'I'm possible'!**

– *Audrey Hepburn*



# Conclusions

- Non healing wounds following surgery or trauma should be explored for Nocardiosis
- Granulomatous lesion should also be ruled out for Nocardia
- Resistance to commonly used antimicrobials is on the rise



# Take home message

- 1. Prevent the possible breach of sterilization protocol of laproscopic and surgical instruments.
  - a) GTA (**Guteraldehyde**) 2% for 30 mins isn't sufficient, P<sup>H</sup> (3-4) needs to be assessed everyday (half life 20-28 days) or at least **8 hrs** soaking is needed.
  - b) OPA (**Orthophthaldehyde**) or Cidex for **30 mins**.
- 2. Use of 10% house bleach for floor/ surfaces(Na-hypochloride)
- 3. Use of autoclavable/disposable instrument.
- 4. Plasma sterilizer or Ethylene Oxide in between consecutive surgery or procedure.
- 5. Enzyme or Ultrasonic technology in device cleaning with autoclaved water.

Reported by `Umar (RA) said: I heard Messenger of Allah (peace be upon him) saying: "If you all depend on Allah with due reliance, He would certainly give you provision as He gives it to birds who go forth hungry in the morning and return with full belly at dusk". [Tirmidhi]

Sometimes, we think it is our careers that put food on our table, let us remember that all provisions come from Allah. Say Alhamdulillah

