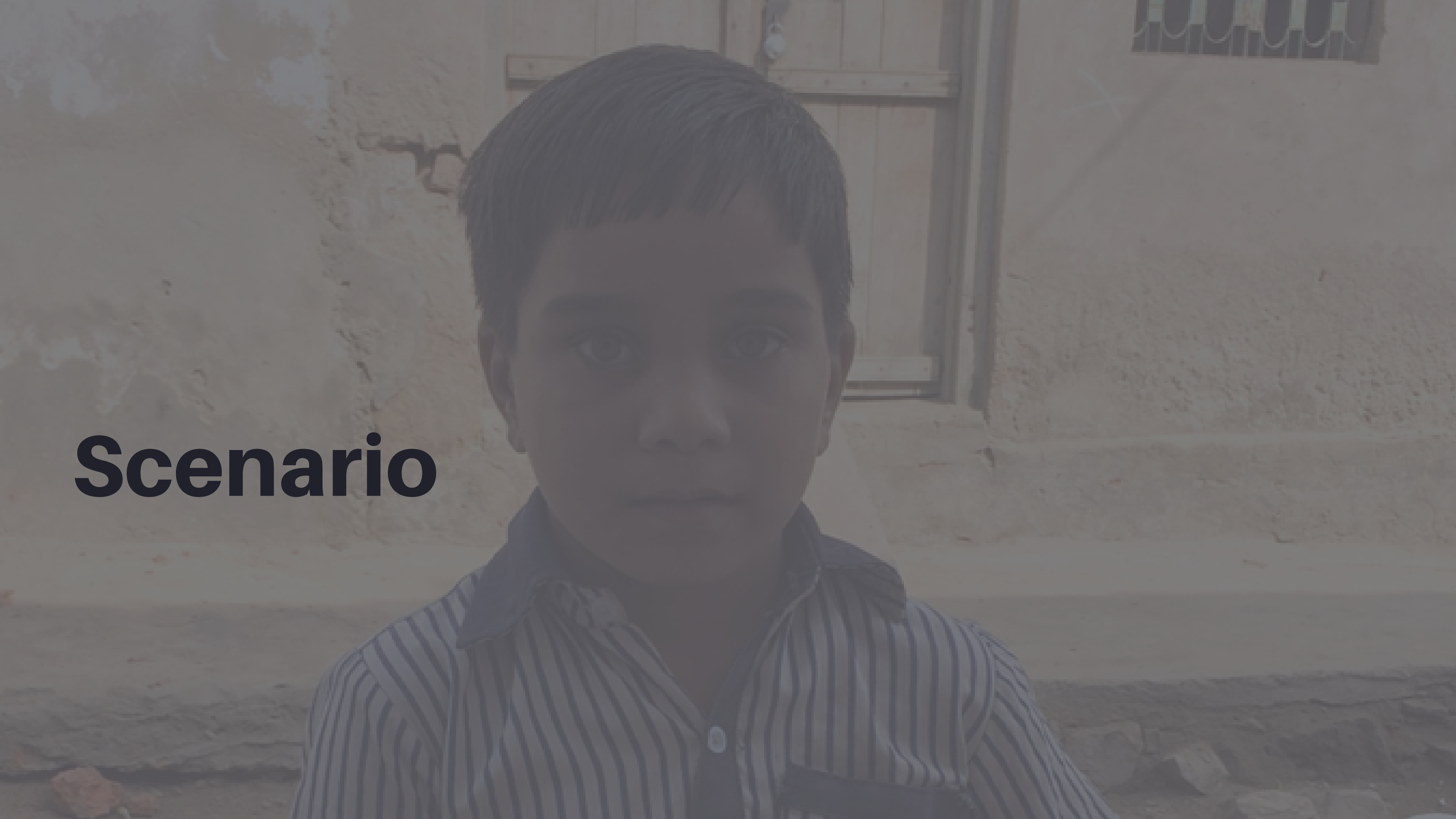


ENGINEERING INNOVATION & DESIGN

Pre Fenyl

Areej, Narjis, Sameer - GS03



Scenario

Scenario

TW: Death of a parent, grief, anger, mention of hospital and funeral

·
My mom died suddenly and very very traumatically around a month ago (though she wasn't in any pain). She died horrifically. She was only 51 years old and she died because of post op complications after a procedure that has a 98% success rate, a week after the procedure.

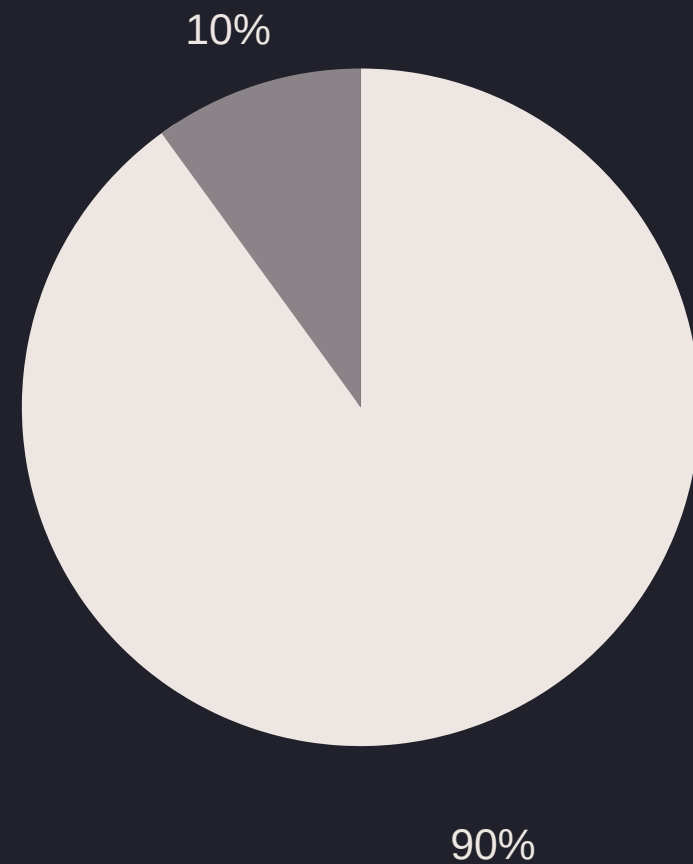
Need Statement

Devising a better mechanism to reduce bacteria and causes of infections inside wards of public hospitals to reduce post-operative complications

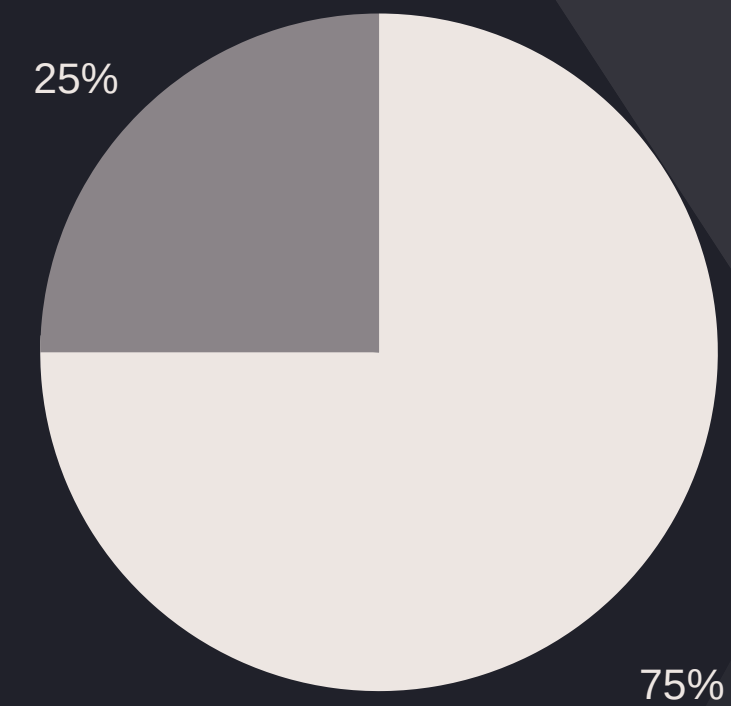


Post Surgical Complication:

causing morbidity and mortality



Developed countries



LMICs

UV light

Traditional
microscopic
analysis

Chemical
analysis
(ATP, cell component
count)

Electric
analysis
(electronic particle in
electric field count)

Spectro-
photometry
(light scattering)

SERS based on 3-MBPA as a capturer and
indicator molecule using optical analysis

A
D
A
P
T
A
B
L
E

C
E
O
F
S
F
T
E
-
C
T
I
V
E



The research

Mercaptophenylboronic acid (3-MPBA) as ideal capturer and identification molecules for biosensor applications due to their high affinity for diols and stability.

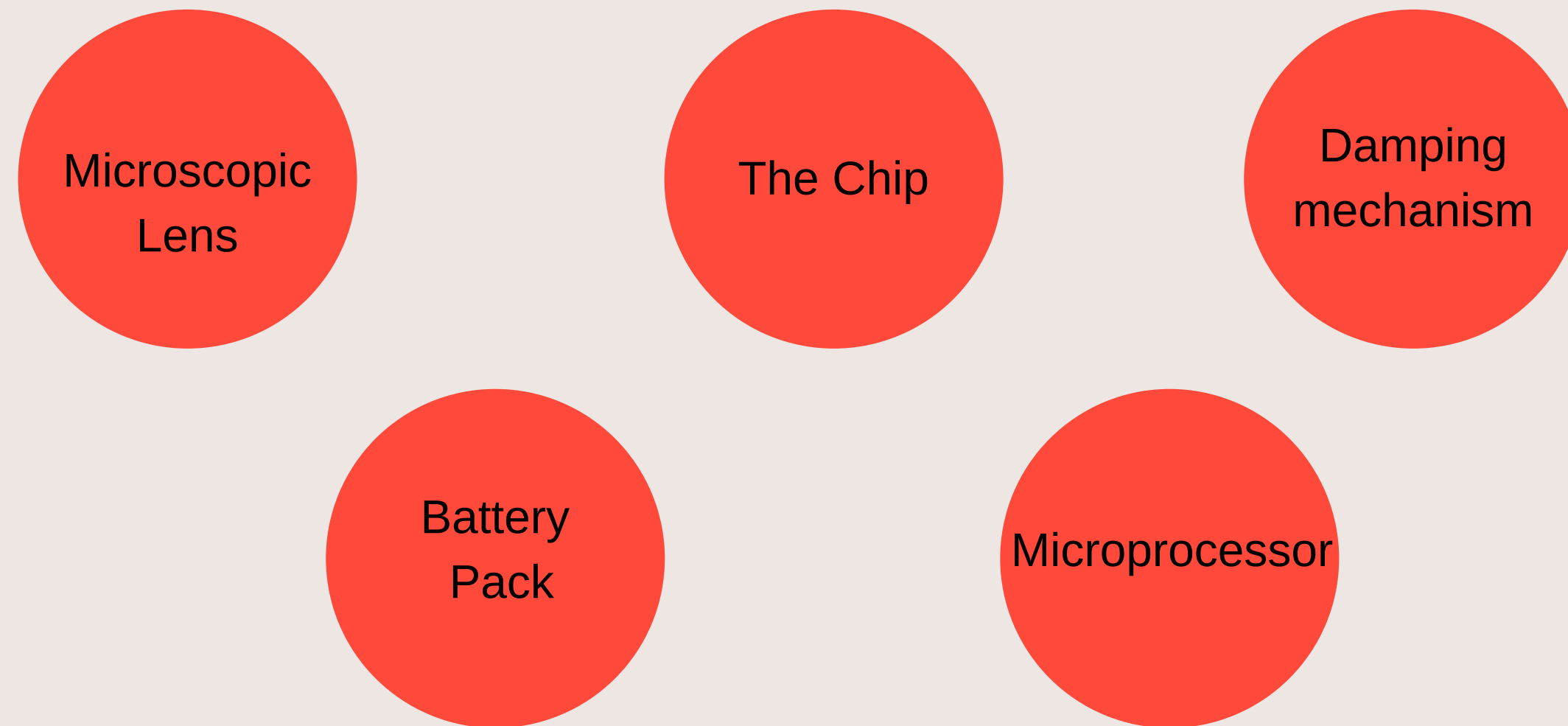
Surface Enhanced Raman Spectroscopy: surface-sensitive technique that enhances Raman scattering by molecules adsorbed on rough metal surfaces or by nanostructures.

Raman scattering is the inelastic scattering of a photon by molecules which are excited to higher energy levels. UV, Vis, IR

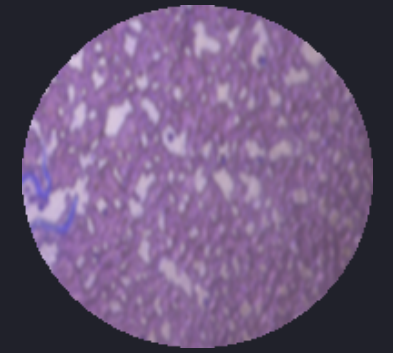
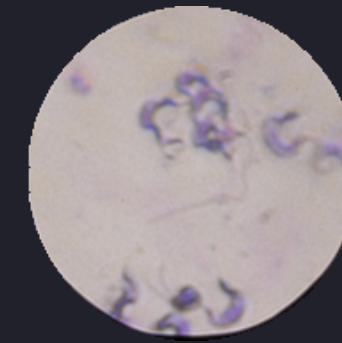
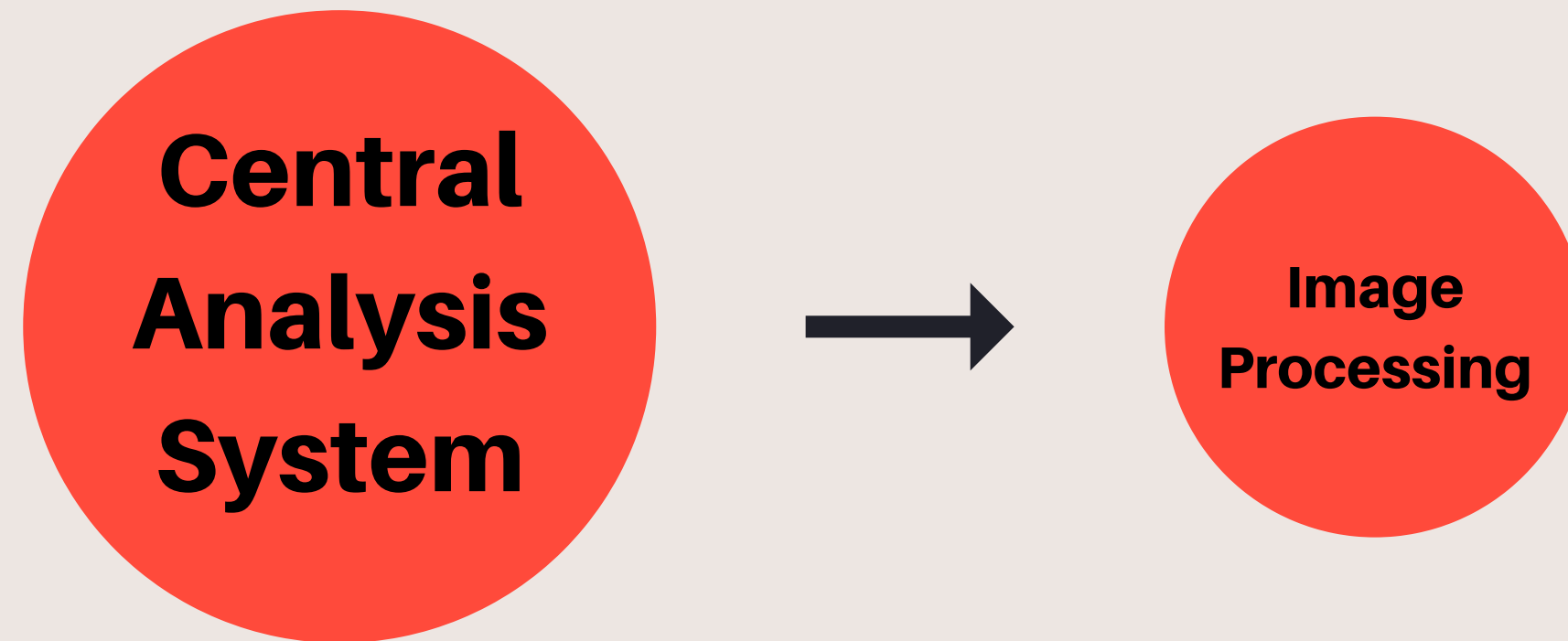
Chip preparation: 2.5 by 3.5 mm gold coated slide – distilled water, ethanol, 3-MBPA



the device



Back End



STAKEHOLDERS

Hospital
Staff

Hospital
Administration

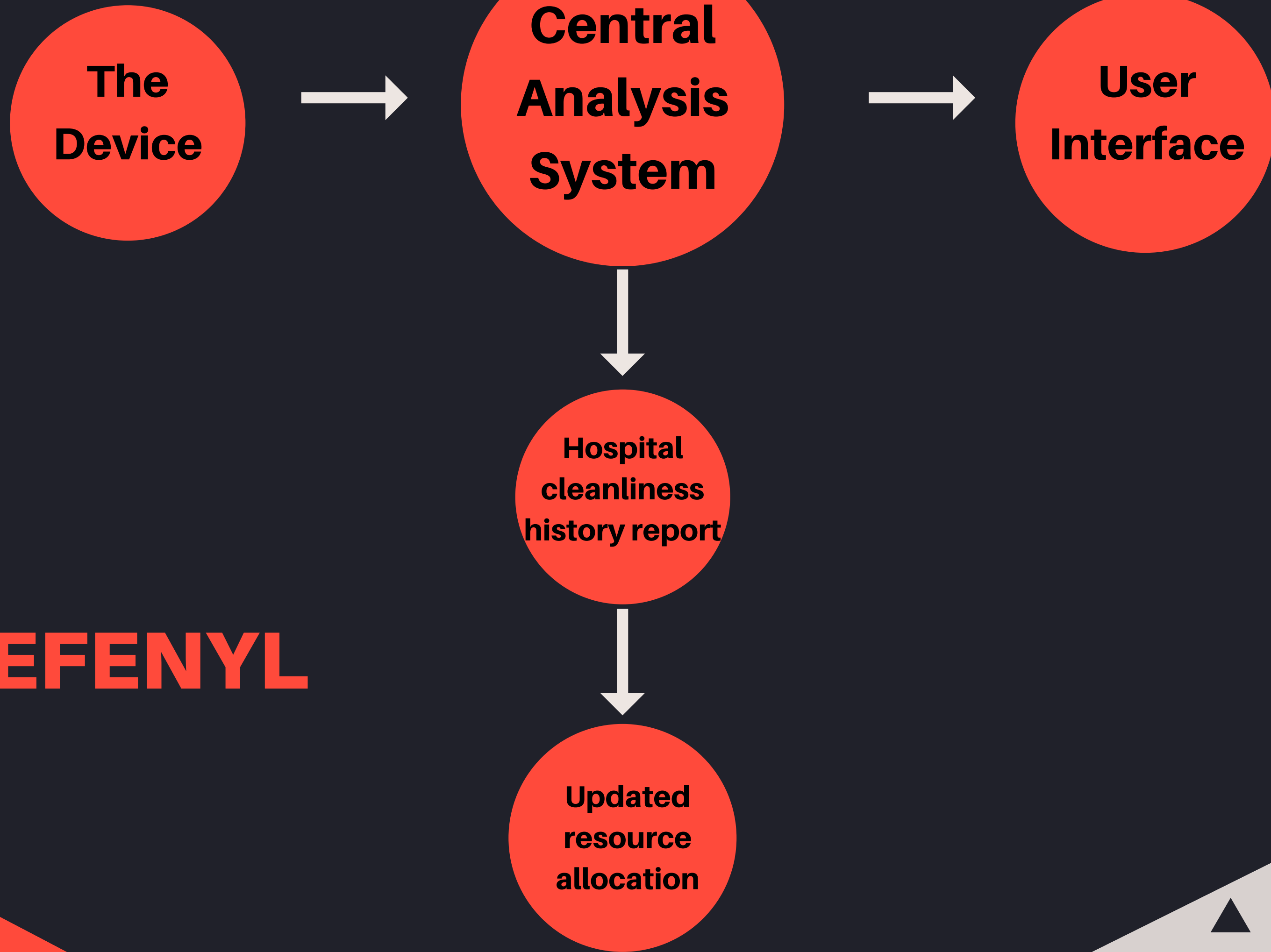
Patient

UMass
Research
Facility

Pakistan Medical and
Dental Council
(PMDC)

Foldscope

PREFENYL



Cost Breakdown

Cost of the Components

- Camera \$4.0
- Lens \$0.5
- Battery \$1.0
- Microcontroller \$3.0
- Motor \$3.0
- Casing \$0.5
- Chip \$0.5/10 patients

Cost per 100 beds for 2 years for 20,000 patients = \$1600

5 sensors/10 beds with 2 years life and replaceable chip.

Cost of Second Surgery due to Post Operative Infections currently = \$150,000

15% infection rate for 20,000 people = 3000 patients

Average Cost of Second Surgery + Bed Charges + Other administrative costs = \$50



PreFenyl

Sensitive

Flexible

Rapid

Adaptable

Cost-effective

A person is walking away from the camera down a long, dimly lit hallway. The hallway has doors on both sides and a handrail on the right. The person is in the center of the frame, walking towards a bright light at the end of the hallway. The overall mood is mysterious and futuristic.

PreFenyl

Pre order now



Pre Fenyl| GS03

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