

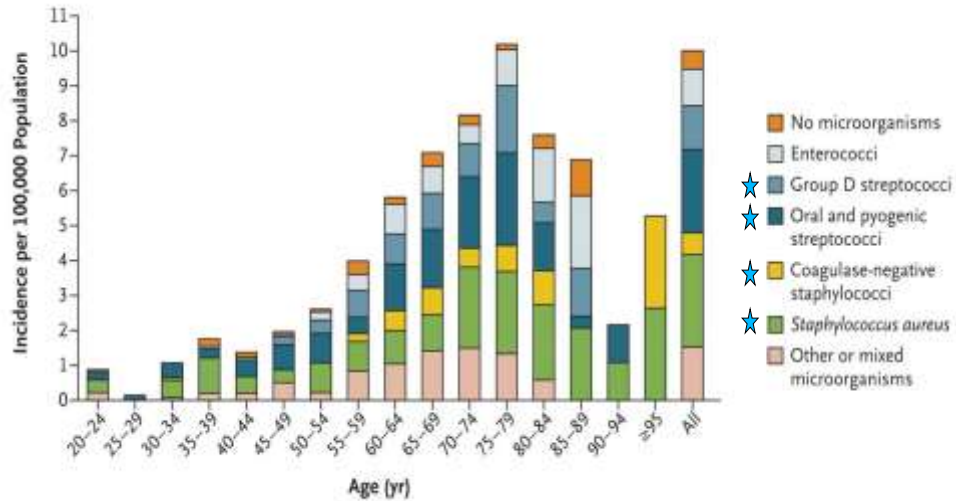
# **Infective Endocarditis Still a formidable challenge**

HUSSIEN RIZK.

## **Persistent difficulties**

- Late diagnosis
- Negative cultures
- Lacking serologic testing
- Resistant organisms
- High complication rate
- Healthcare associated IE
- Fungal IE
- Prosthetic IE

## Incidence of Definite Infective Endocarditis, According to Age and Microorganism.



Hoen B, Duval X. N Engl J Med 2013;368:1425-1433

## Risk Factors and Co-morbidities

Risk Factor	Kasr Al Ainy	NHI	Whole
Diabetes Mellitus	20 (5.9%)	12 (5.3%)	32 (5.7%)
CKD	41 (12.3%)	5 (2.2%)	46 (8.2%)
Hemodialysis	19 (5.7%)	2 (0.9%)	21 (3.7%)
Prior infective endocarditis	13 (3.9%)	8 (3.5%)	21 (3.7%)
IV abuse	<b>21 (6.3%)</b>	<b>20 (8.8%)</b>	<b>41 (7.3%)</b>

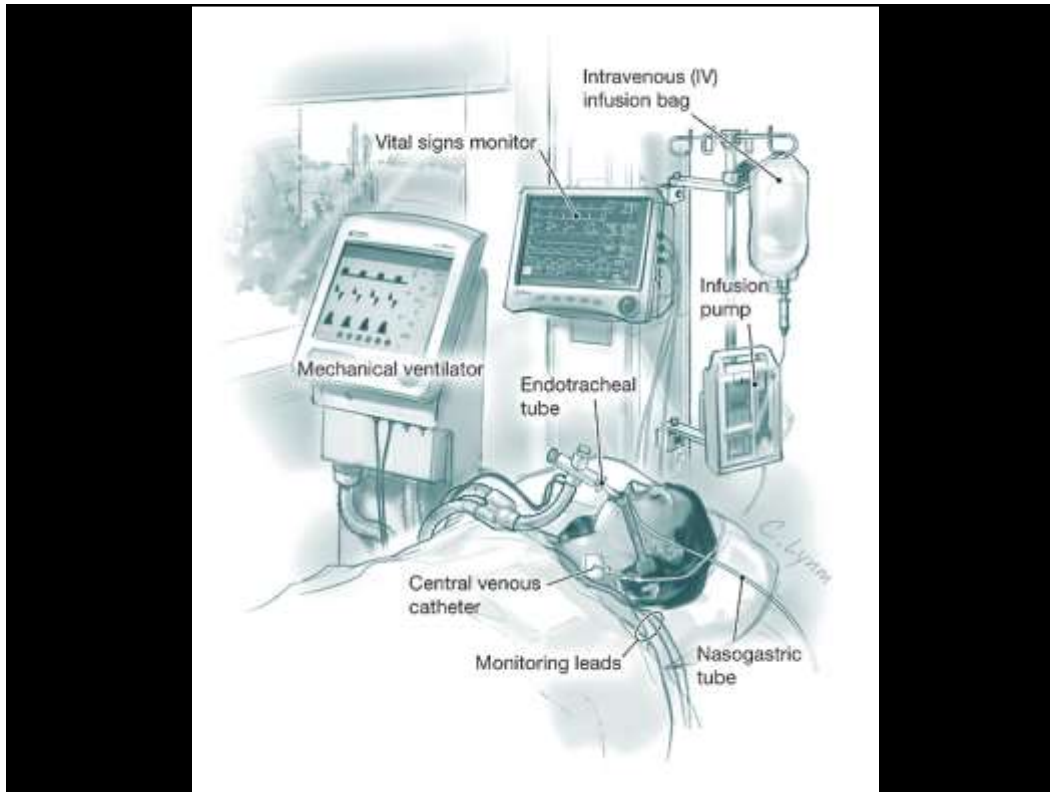
## Predisposing Cardiac Condition

Condition	Kasr Al Ainy	NHI	Whole
Underlying cardiac condition	262 (78.4%)	191 (83.8%)	453 (80.6%)
Known Cardiac condition	215 (64.4%)	182 (79.8%)	397 (70.6%)
Diagnosed on admission	37 (11.1%)	9 (3.9%)	46 (8.2%)
Rheumatic Heart Disease	132 (39.5%)	186 (81.6%)	318 (56.6%)
Congenital Heart Disease	33 (9.9%)	5 (2.2%)	38 (6.8%)
Degenerative / Floppy Valve	22 (6.6%)	3 (1.3%)	25 (4.4%)
Other prosthetic material	11 (3.3%)	3 (1.3%)	14 (2.5%)
Hypertrophic Cardiomyopathy	3 (0.9%)	1 (0.4%)	4 (0.7%)
<b>Normal Heart</b>	<b>72 (21.6%)</b>	<b>37 (16.2%)</b>	<b>109 (19.4%)</b>

## Pre-Hospital Course

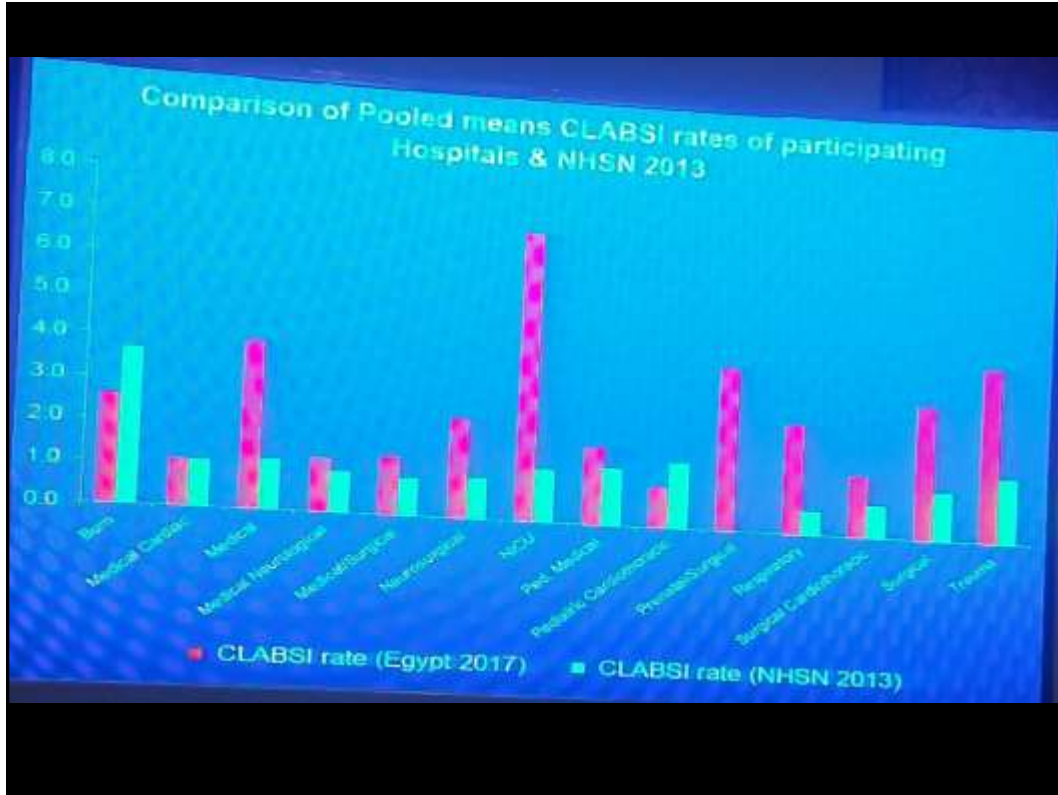
Parameter	Kasr Al Ainy	NHI	Whole
Duration of symptoms	59.4 ± 87.4	64.2 ± 76.4	61.3 ± 81.2
AB prior to BC	214 (64.1%)	205 (89.9%)	419 (74.6%)
Health-care acquired endocarditis	57 (17.1%)	35 (17.9%)	92 (16.4%)
Procedures within 3 months	43 (12.8%)	15 (6.6%)	58 (10.3%)





## IE complicating SA bacteremia

- IE is common & often devastating complication of SAB, incidence 10 -15 % in adults & children.  
Gopal et al. J Clin Oncol 2000; 18:1110; Valente et al. Pediatrics 2005; 115:e15
- Risk factors for IE in the setting of SA bacteremia:
  - Prosthetic valve (up to 50%)  
Fang et al. Ann Intern Med 1993; 119:560
  - Predisposing cardiac abnormalities
  - Injection drug use
  - Intravascular catheter infection
  - Bacteremia of unclear origin
  - Persistent bacteremia



## Laboratory findings on admission

Lab work	Kasr Al Ainy	NHI	Whole
Hemoglobin on admission	10.2 ± 6.3	9.7 ± 6.9	10.1 ± 7.2
TLC on admission	12.7 ± 7.1	11.8 ± 8.2	12.1 ± 7.2
Positive RF	35 (10.5%)	37 (16.2%)	72 (12.8%)
CRP values	<b>114 ± 69.4</b>	<b>87 ± 71.2</b>	<b>100.6 ± 74.2</b>

## Microbiologic diagnostics

Microbiology Lab	Kasr Al Ainy	NHI	Total
Positive blood culture	<b>181 (54.2%)</b>	<b>101 (44.3%)</b>	<b>226 (40.2%)</b>
Serologic testing	218 (65.3%)	228 (100%)	446 (79.4%)
Positive Serologic testing	<b>39 (17.9%)*</b>	<b>21 (9.2%)</b>	<b>60 (13.5%)**</b>
Polymicrobial endocarditis	13 (3.9%)	10 (4.4%)	23 (4.1%)
Positive specimen	84 (25.1%)	25 (10.9%)	109 (19.4%)

\* For those who had serologic testing

\*\* estimated based on those only had sero-testing.

S.Aureus	140
Strept-	70
Zoonotic	42
Fungal	33

## Causative organisms

Organisms*	QA	NHI	Total
Staphylococcus aureus	72 (21. 5%, 40%)	68 (30%, 67%)	140
Streptococci sp.	41	29	70
Gram Negative Bacilli	21	14	35
Enterococci sp.	18	1	19
Brucella**	12	12	24
Bartonella**	9	3	12
Coxiella**	3	3	6
Aspergillus**	17	3	20
Candida sp.	10	3	13
HACEK group	2	0	2

\* Percentage were not calculated for the variety of identification methods – no statistic value for comparison.

\*\* For those who had serologic testing - estimated based on those only had sero-testing.

## Echocardiographic data\*

Site	QA	NHI	Whole
Native valve endocarditis	178 (53.3%)	94 (41.2%)	272 (48.4%)
Prosthetic valve endocarditis	114 (34.1%)	133 (58.3%)	247 (43.9%)
Non-valvular endocarditis	27 (8.1%)	5 (2.2%)	32 (5.7%)
Mitral valve endocarditis	222 (66.5%)	131 (57.5%)	353 (62.8%)
Aortic valve endocarditis	193 (57.8%)	104 (45.6%)	297 (52.8%)
Tricuspid valve endocarditis	32 (9.6%)	22 (9.6%)	54 (9.6%)
Pulmonic valve endocarditis	4 (1.2%)	2 (0.8%)	6 (1.1%)
Avg. vegetation size (mm)	10.8 ± 10	11.4 ± 8	11.1 ± 9

\* Overall estimate as each treated as separate identity.

## In-Hospital Course

Events	Kasr Al Ainy	NHI	Whole
Adequate response to therapy	135 (40.4%)	143 (62.7%)	278 (49.5%)
Indicated for surgery	231 (69.2%)	85 (37.3%)	316 (56.2%)
Indicated surgery performed	154 (46.1%)	65 (28.5%)	219 (39%)
Surgery indicated but not performed	77 (23.1%)	20 (8.8%)	97 (17.3%)
Surgical mortality	29 (8.7%)	11 (4.8%)	40 (7.1%)

## Complications

Complication	Kasr Al Ainy	NHI	Whole
CHF	151 (45.2%)	42 (18.4%)	193 (34.4%)
ARF (s. Cr. > 2 mg/dL)	80 (24%)	52 (22.8%)	132 (23.5%)
Major artery embolization	119 (35.6%)	71 (31.1%)	190 (33.8%)
Fulminant sepsis	39 (11.7%)	21 (9.2%)	60 (10.7%)
Aortic root abscess	30 (9%)	38 (16.7%)	68 (12.1%)
Mycotic aneurysms	20 (6%)	14 (6.1%)	34 (6%)
All-cause mortality	76 (22.8%)	51 (22.4%)	125 (22.2%)



## Independent predictors of hospital mortality in PVE (ICE series report)

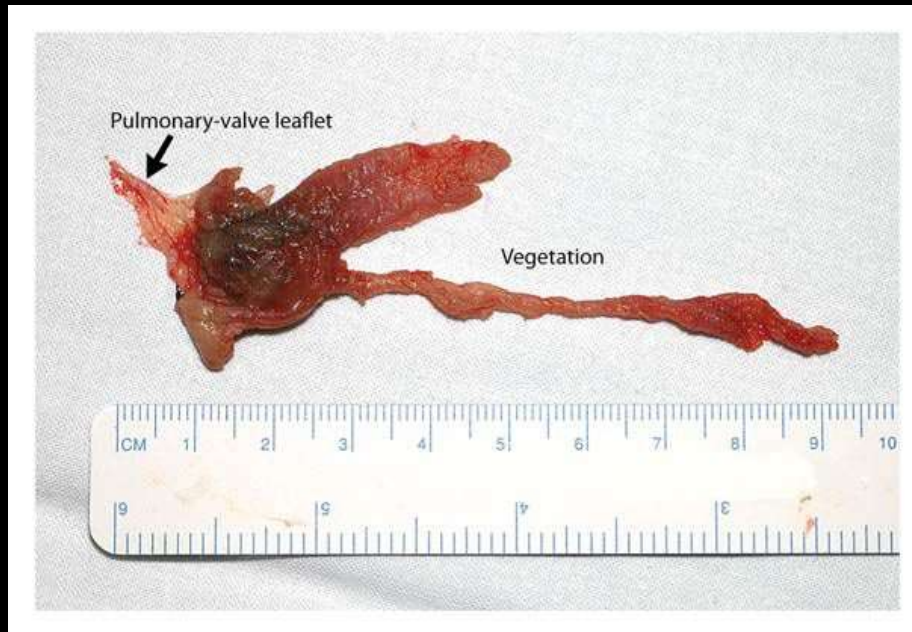
- Age
- HCAE
- Staphylococcus aureus
- Persistent bacteremia
- Heart failure
- Cardiac abscess
- Stroke

## **“Our” PVE**

### Baseline clinical and demographic characteristics

- 66 patients with definite PVE
- Young (30.5y) - Males (59.1%)
- Early PVE 39.4%
- Only 6 patients had a non-cardiac risk factor for IE, most common was diabetes (3 patients)
- Median duration of symptoms before referral 15 d
- **71.2% developed a major complication before referral.**
- **59.1% used antibiotics before referral**
- **45.5% had blood cultures withdrawn.**

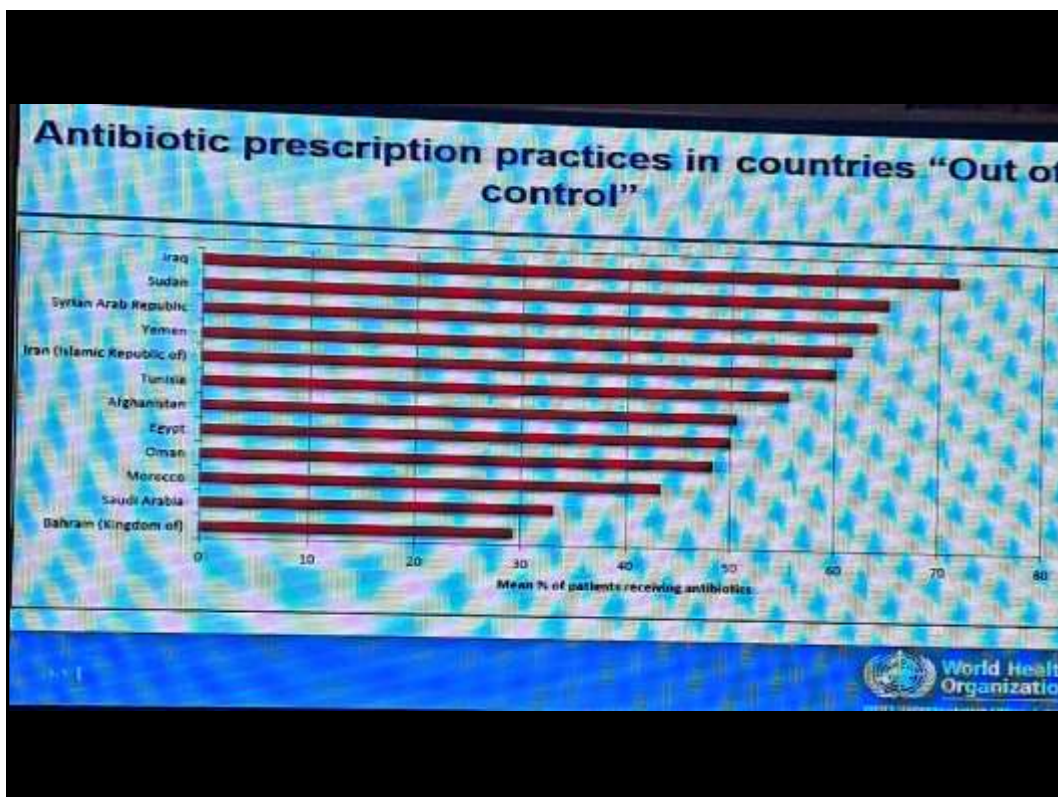
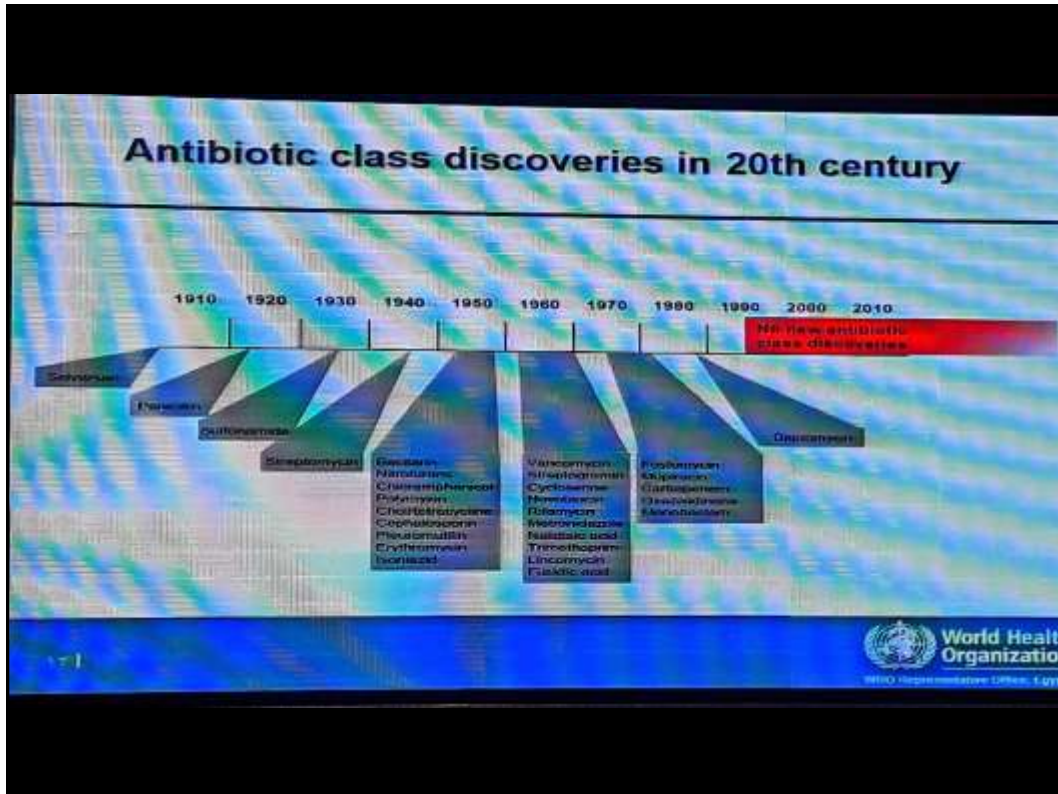
### Surgical Specimen of a Resected Pulmonary-Valve Leaflet

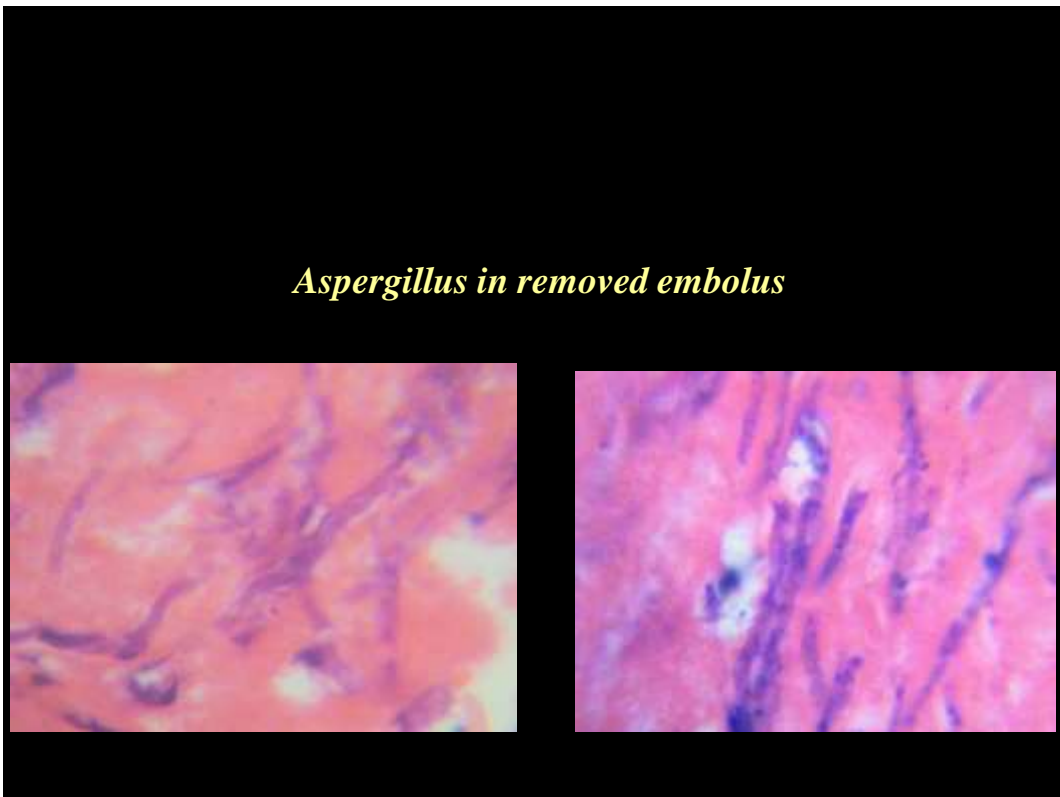
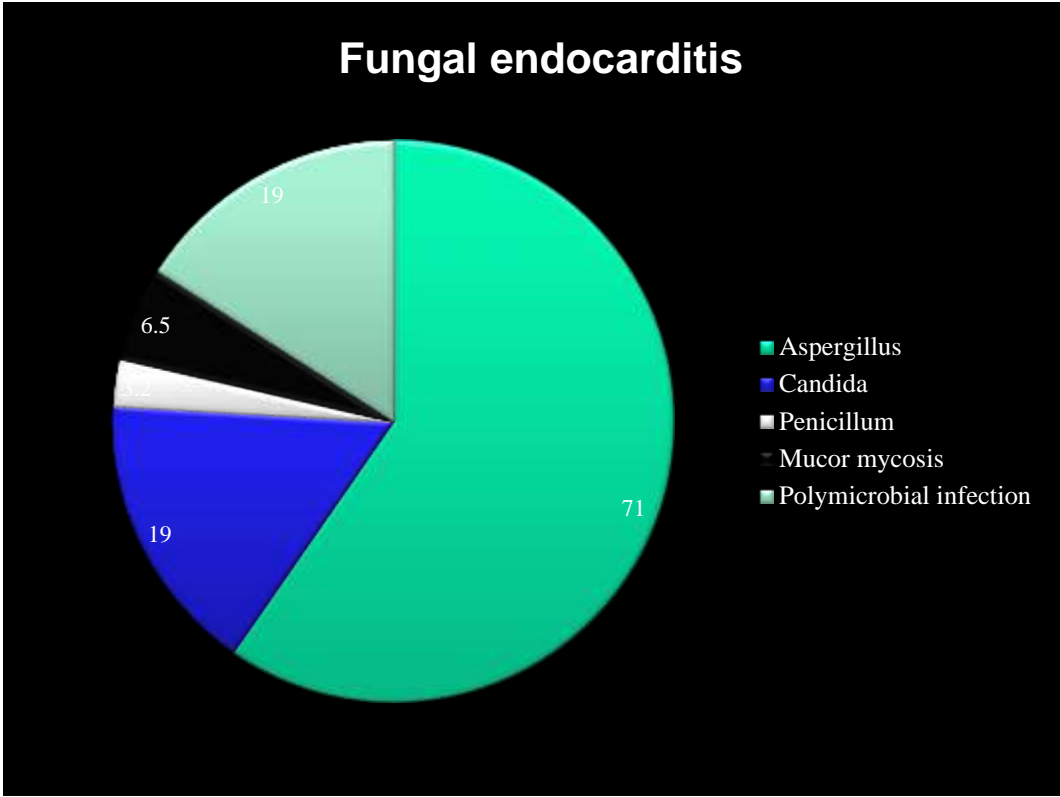


Kang N et al. N Engl J Med 2007;356:2224-2225

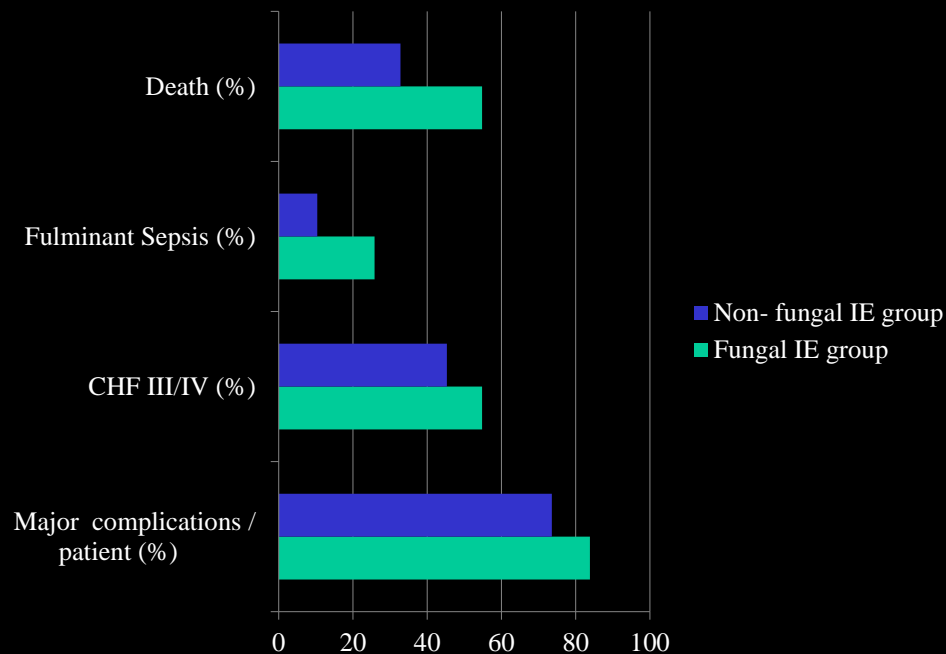
## Antibiotic resistance: the looming disaster

- Bacteria – not humans – invented antibiotics
- Many pathogens develop resistance to antibiotics without prior exposure!
- Major consumers of antibiotics are meet & poultry industry
- The pipe line is empty!
- Several megabugs are already resistant to all known antibiotics





## Major complications



## Summary

- Though the diagnosis of IE improved markedly in the tertiary referral centers, the identification of the disease in primary care settings is late
- The frequency of complications at presenting to tertiary care is high. This leads to more need for surgery and also to higher hospital mortality
- The high frequency of healthcare associated (and fungal) IE is ominous, and calls for prompt serious action
- The early indiscriminate antibiotic use without prior blood cultures is a continuing national disgrace!
- The most decisive factor in improving outcome of our patients was early performance of indicated surgery