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on behalf of The ECMM/ISHAM Working Group



Fungiscope

Rare Invasive Fungal Infection in India

Factors that are prerequisites for the development of IFI

- Exposure to fungi
- Host acquisition of potential pathogen
- Competition with microbial flora
- Disruption of skin or mucous membrane barriers
- Sufficient growth to overcome host defenses

Risk factors

- Prolonged immunosuppression (HIV/AIDS, cancer, SOT, HSCT)
- central venous catheter, mechanical ventilation, parenteral nutrition, burns
- Diabetes mellitus
- Broad-spectrum antibiotics



- Collect epidemiological and clinical data on invasive infections caused by emerging fungal pathogens
- Provide data for analysis of risk factors and treatment strategies to guide treatment recommendations
- Build a biobank of emerging fungi
- Collaborate with other groups for joint analyses

Improvement in the outcome of invasive fusariosis in the last decade

M. Nucci¹, K. A. Marr², M. J. G. T. Vehreschild³, C. A. de Souza⁴, E. Velasco⁵, P. Cappellano⁶, F. Carlesse⁷, F. Queiroz-Telles⁸, D. C. Sheppard⁹, A. Kindo¹⁰, S. Cesaro¹¹, N. Hamerschlak¹², C. Solza¹³, W. J. Heinz¹⁴, M. Schaller¹⁵, A. Atalla¹⁶, S. Arikian-Akdagli¹⁷, H. Bertz¹⁸, C. Galvão Castro Jr¹², R. Herbrecht¹⁹, M. Hoenigl²⁰, G. Härter²¹, N. E. U. Hermansen²², A. Josting²³, L. Pagano²⁴, M. J. C. Salles²⁵, S. B. Mossad²⁶, D. Ogunc²⁷, A. C. Pasqualotto²⁸, V. Araujo²⁹, P. F. Troke³⁰, O. Lortholary³¹, O. A. Cornely^{3,32} and E. Anaissie³³

- N=233 cases
- 11 countries
- Death associated with:
 - Corticosteroids (HR 2.11, 95% CI 1.18–3.76, p 0.01)
 - Persistent neutropenia (HR 2.70, 95% CI 1.57–4.65, p <0.001)
 - D-AmB (HR 1.83, 95% CI 1.06–3.16, p 0.03)

Inclusion

Invasive fungal infection documented by at least one of the following

- Culture
- Histology
- Antigen detection
- PCR-based detection of fungal DNA



Aspergillus

Exclusion

- Infection due to *Aspergillus*, *Candida*, *Cryptococcus neoformans*, *Pneumocystis jiroveci*
- Endemic fungal infection such as coccidioidomycosis or histoplasmosis
- Colonisation or other non-invasive infection



www.fungiscope.net



Registration and Password Acquisition

register@fungiscope.net



Electronic Case Report Form



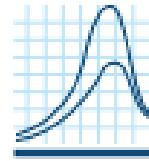
Diagnostics



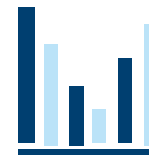
**FungiThek
Culture/Biopsy
Banking**



**FungiQuest
Database
Search**



**Therapeutic
Drug
Monitoring**



**Statistical
Analysis**



CLINICALSURVEYS.NET



Add a new patient



Start the survey

- ✓ Risk Factors
- ✓ Diagnostic Procedures
- ✓ Clinical Signs and Symptoms
- ✓ Site of Infection
- ✓ Mycological Evidence
- ✓ Treatment
- ✓ Outcome

Risk Factors

Which risk factors were present?

Immunosuppression

- ☒ Chemotherapy
- ☐ Hematopoietic stem cell transplantation (HSCT)
- ☐ HIV/AIDS
- ☐ Solid organ transplantation
- ☐ Other disorder requiring any kind of immunosuppression (including steroids)

Trauma/Intervention

- ☐ Burn
- ☐ Major surgery (not including surgery as part of antifungal therapy)
- ☐ Trauma

Chronic disease/behavioral factor

- ☐ Alcoholism
- ☐ Chronic liver disease
- ☐ Chronic pulmonary disease
- ☐ Chronic renal disease
- ☐ Diabetes mellitus
- ☐ IV drug user
- ☐ Premature birth

Other

- ☐ Other risk factor (please specify)
- ☐ No risk factor identified

Please specify the underlying disease requiring chemotherapy:

Acute Lymphoblastic Leukemia

Please specify the type of chemotherapy:

anthracycline, prednisone

Primary course or relapse?

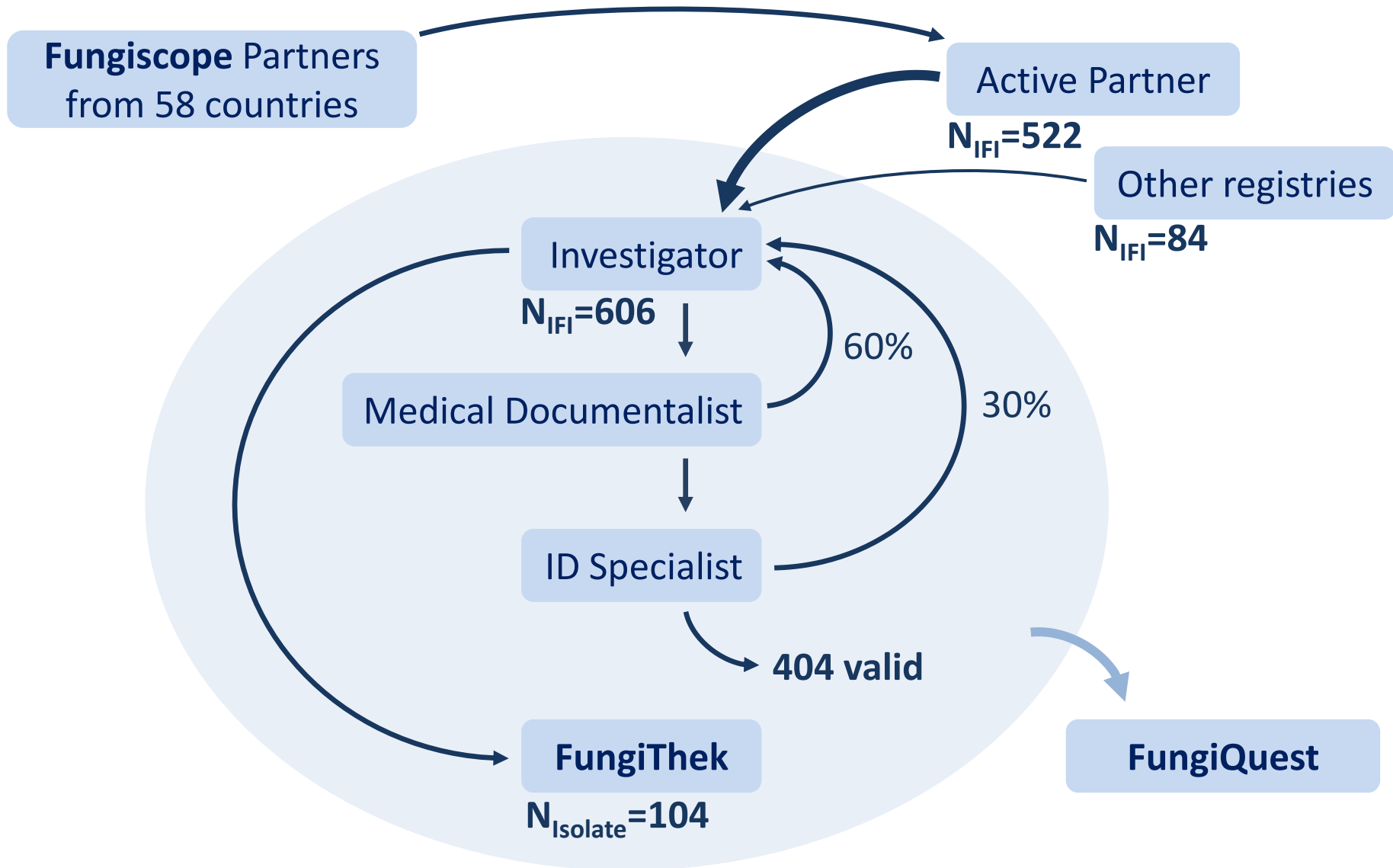
- ☒ Primary course
- ☐ First relapse
- ☐ Second or later relapse
- ☐ not applicable

Was the patient neutropenic within the last four weeks prior to or at diagnosis of the fungal infection?
(Absolute neutrophil count < 500 or leukocytes < 1000)

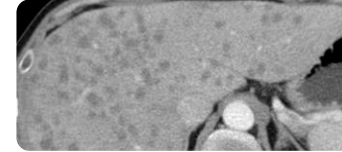
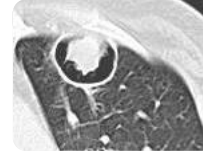
From Day 10 Month Feb Year 2014
To Day 17 Month Feb Year 2014

Did the patient receive growth factors?

- ☐ Experimental CSF (specify):
- ☐ G-CSF
- ☐ GM-CSF
- ☐ M-CSF
- ☐ Multiple CSF
- ☒ No

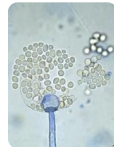
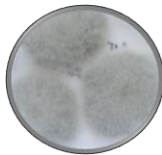


Diagnosis of rare IFI



Central storage of isolates

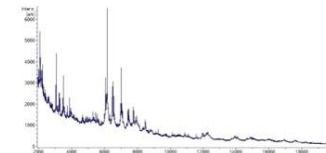
Diagnostic laboratories



Macroscopic and
microscopic
identification

ATCATTAGTGGCTTTATAGGCTTATACTATATCCACTTACAC
CTGTGAACCTTCTACTACTTGAGCGAGTCGATATTTTCAAC
AATGTGTAATGAACCTCGTTTATATATAACAAATAAACTTTCAC
AACGGATCTCTTGCTCTGGCATCGATGAAGAGCGAGGAAATTCG
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CATGCTCTTTTCAGGACTACCTCGTGAACCTTCGATCGATGAAGAG

Sequencing



Mass Spectrometry

Reference database

Link specimens to clinical and demographic data

Manage requests for specimen use



Diagnosis of rare IFI



www.fungiquest.net
Search the database



Browse through cases



FungiScope® is a global research project of the German Mycological Society, the ISHAM, the ECMM, and other international mycological societies. We collect clinical characteristics, culture and tissue samples of patients with rare fungal diseases. The aim is to create a network of interested researchers, allowing them to share experiences and samples to ultimately improve diagnosis and treatment of these rare infections.

If you'd like further information on the project or would like to register, visit our site www.fungiscope.net.

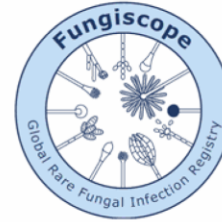
Looking for a specific pathogen? Search our database through FungiQuest™ now! Or jump directly to some of our interesting cases, e.g. [Rhizopus](#), [Fusarium](#), [Scedosporium](#), or [Trichosporon](#).

When searching e.g. for Lichtheimia, remember aliases, in this case Absidia and Mycocladus, to retrieve information on older cases.

Note: Search query must contain at least 5 characters.

 Search the FungiScope® database for:

Pathogen	Risk Factors	Site	Empirical Agents	Targeted Agents
Fusarium solani	Diabetes mellitus	Eyes		Other;_Please_specify, Fluconazole
fusarium solani	Hematopoietic stem cell transplantation (HSCT)	Deep soft tissues, e.g. muscles, Skin, Disseminated	Voriconazole, Liposomal_amphotericin_B, Caspofungin	Voriconazole



Please note that we are currently rebuilding our database and that FungiQuest™ therefore only provides information on about 30% of our cases. Also note that some of these cases were transferred from an older version of our database and not all information has yet been correctly formatted.

All information provided is property of the FungiScope® team of investigators. The content and software may be used as a source of information. Any other use, including the full or partial reproduction, alteration, distribution and/or transmission of the content is strictly prohibited, except as expressly authorized by the FungiScope group as represented by it's chairperson.

ID	Pathogen	Culture	PCR	Risk Factors	Site	Empirical Agents	Targeted Agents	Surgery	Response	Survived	Last observed
15	Fusarium solani	X		Diabetes mellitus	Eyes		Other;_Please_specify, Fluconazole	therapeutic keratoplasty	Stable	Yes	2009
30	fusarium solani	X		Hematopoietic stem cell transplantation (HSCT)	Deep soft tissues, e.g. muscles, Skin, Disseminated	Voriconazole, Liposomal_amphotericin_B, Caspofungin	Voriconazole	No	Deterioration_or_failure	No	2010
32	Fusarium aqueductum	X		Chronic pulmonary disease, Diabetes mellitus	Lungs, Disseminated		Voriconazole, Voriconazole	No	Partial_response	Yes	2009
33	Fusarium species	X		Diabetes mellitus	Deep soft tissues, e.g. muscles, Disseminated			surgical debridement	Unknown	Yes	2007
34	Fusarium solani	X		Chemotherapy, Hematopoietic stem cell transplantation (HSCT), Diabetes mellitus	Bloodculture, Bones, Deep soft tissues, e.g. muscles, Lungs, Disseminated		Liposomal_amphotericin_B, Voriconazole	No	Deterioration_or_failure	No	2008
35	fusarium dimerum	X		Major surgery (not including surgery as part of antifungal therapy), Chronic renal ..	Lungs, Disseminated			No	Complete_response	Yes	2009



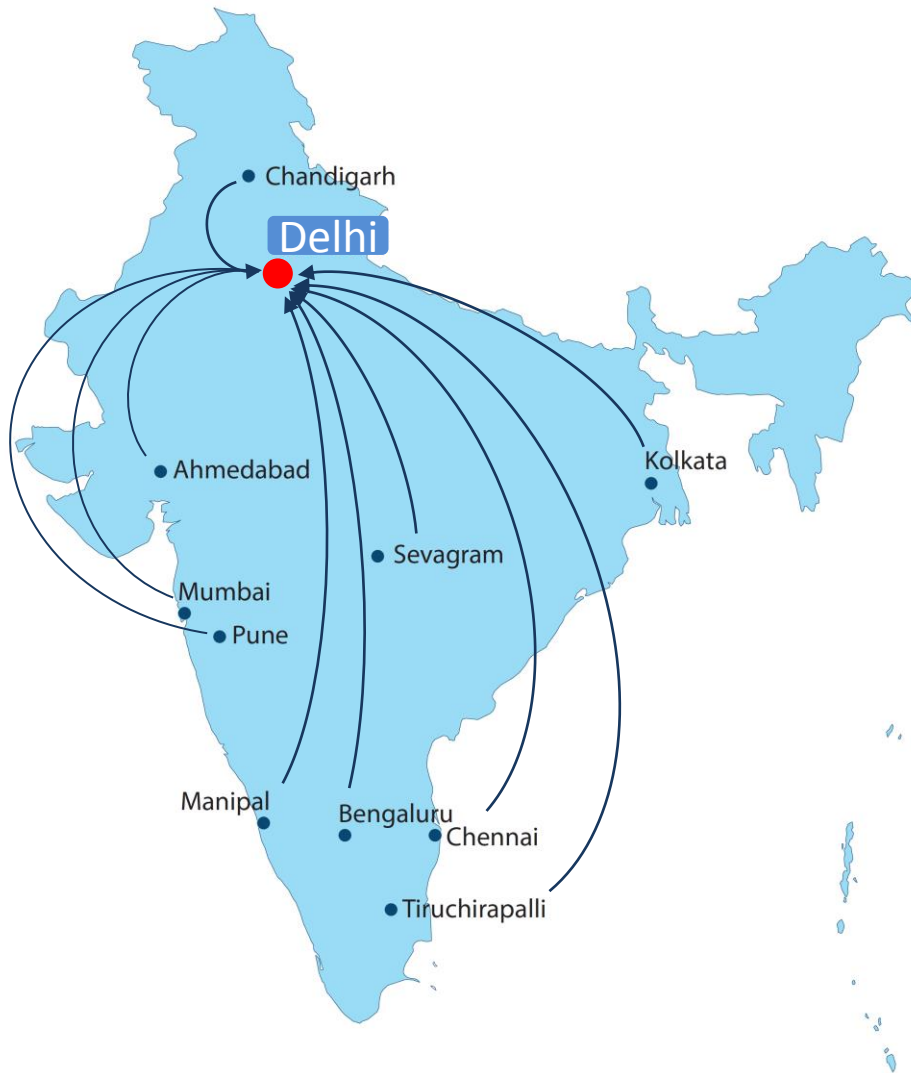
Partner Sites in India





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Central Laboratory in India



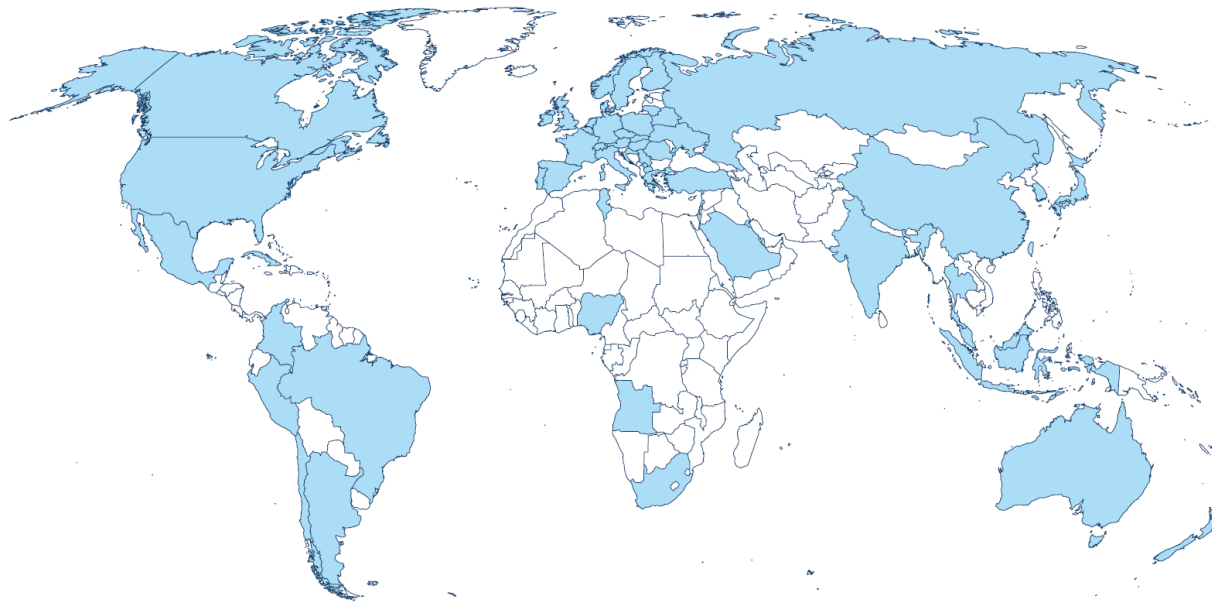
Anuradha Chowdary

Vallabhbhai Patel Chest Institute
Department of Medical Mycology
University of Delhi
Delhi

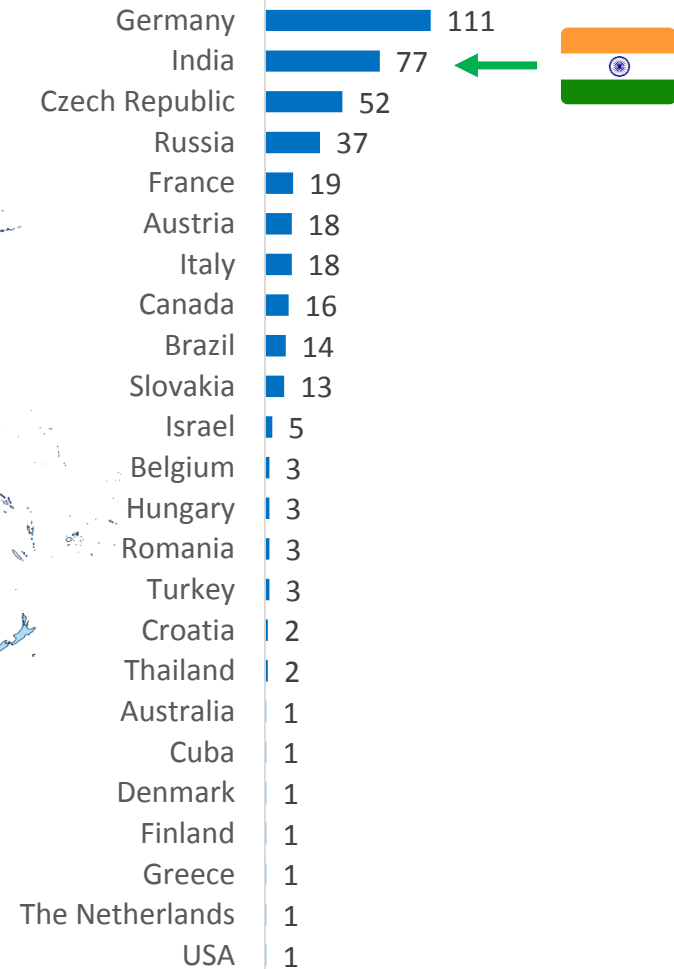
dranuradha@hotmail.com



404 Valid Cases from 24 Countries

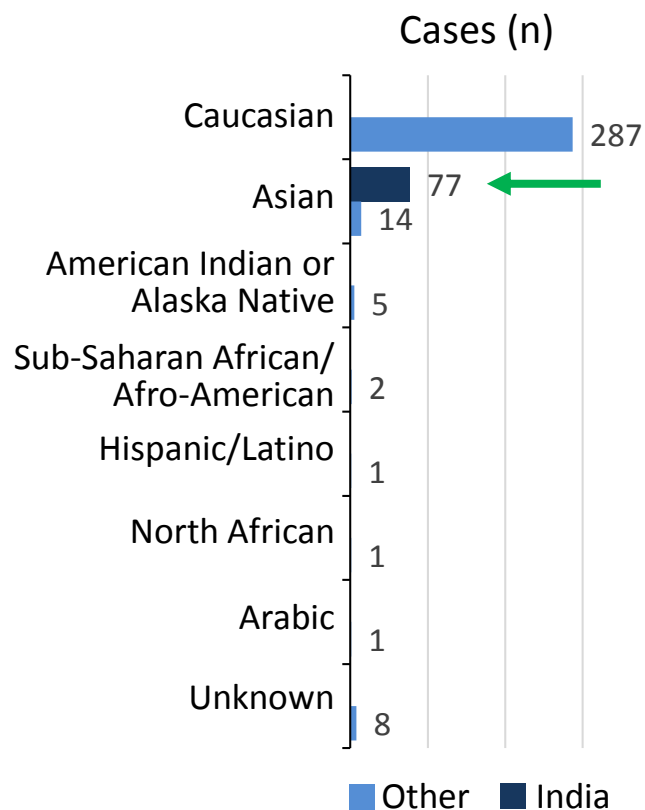


Cases





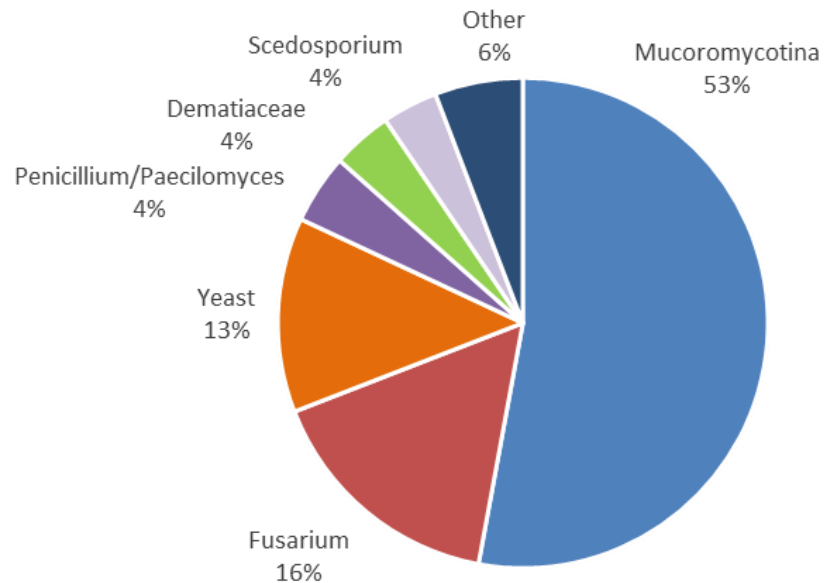
404 Cases – Demographic Features



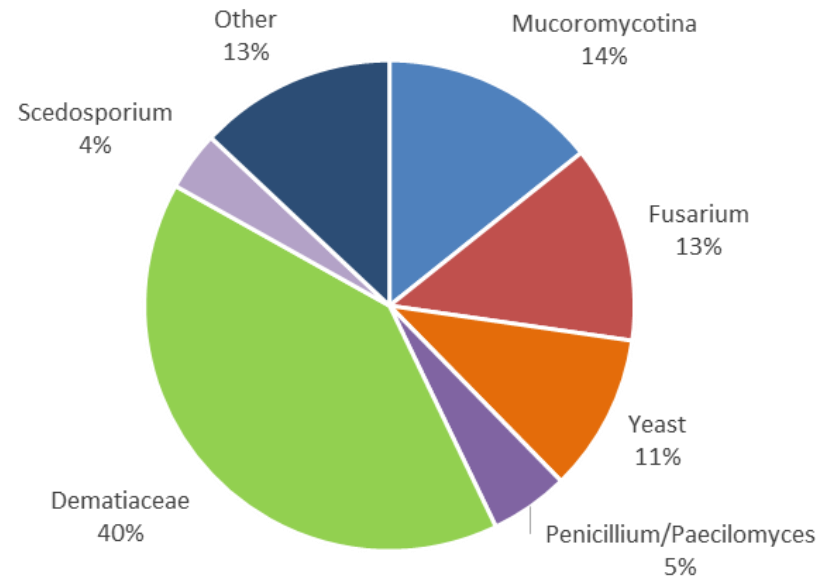
	India n=77	Other n=327
Median Age	48	51
Age Min-Max	2-78	0-83
Gender (Female %)	26	37
Weight (kg)	63	69
Height (cm)	163	170



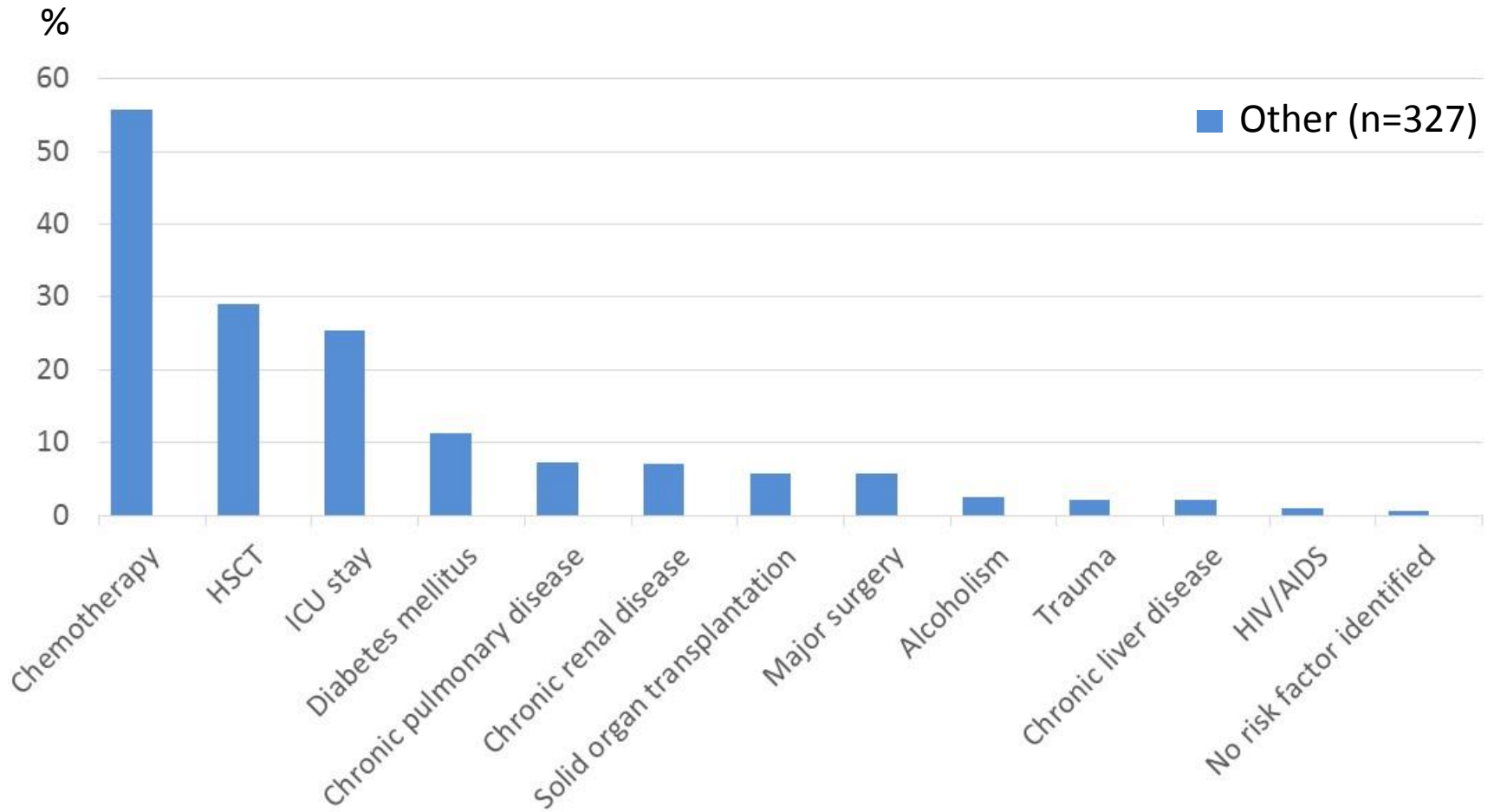
327 cases from countries other than India



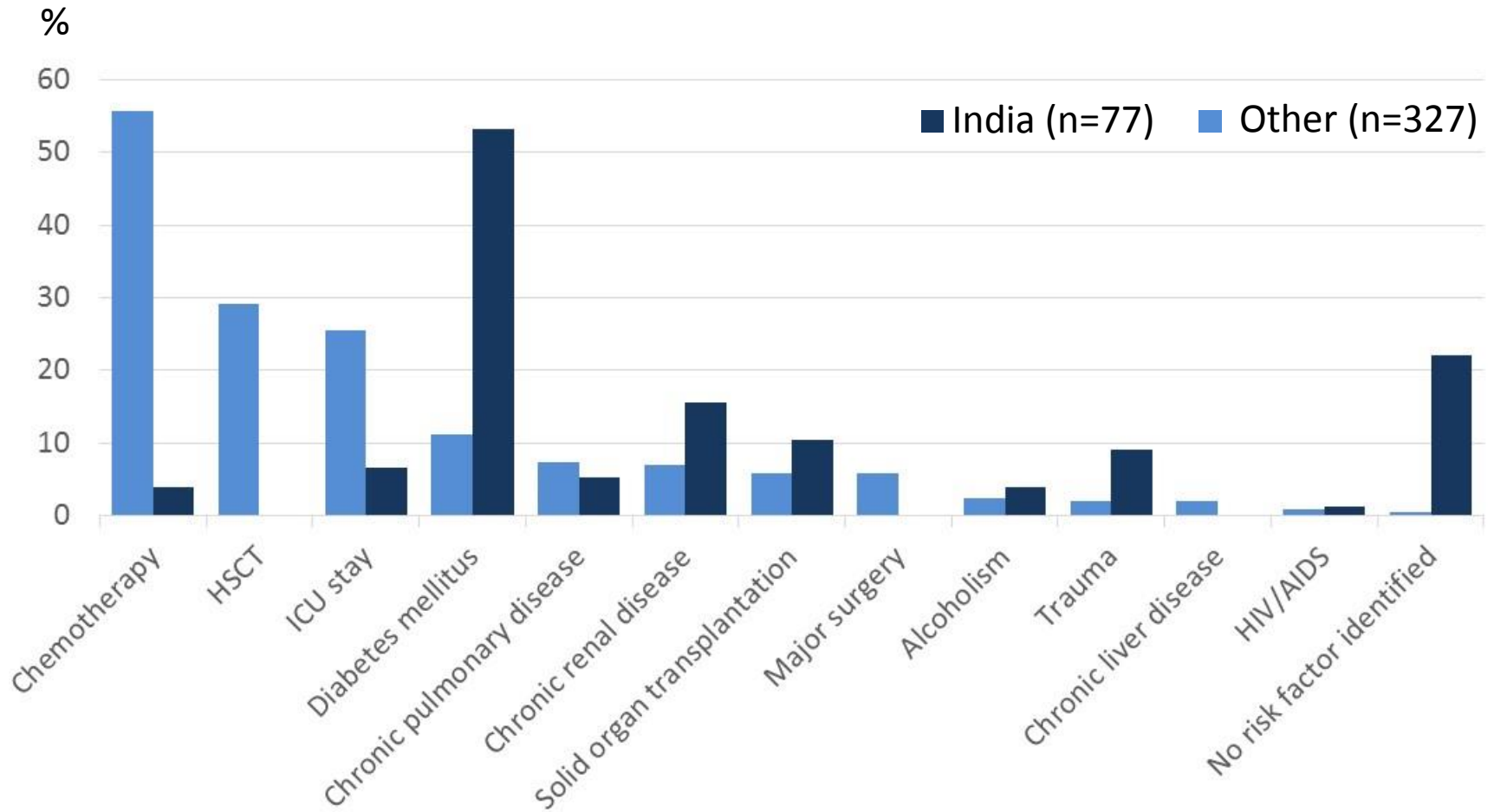
77 cases from India



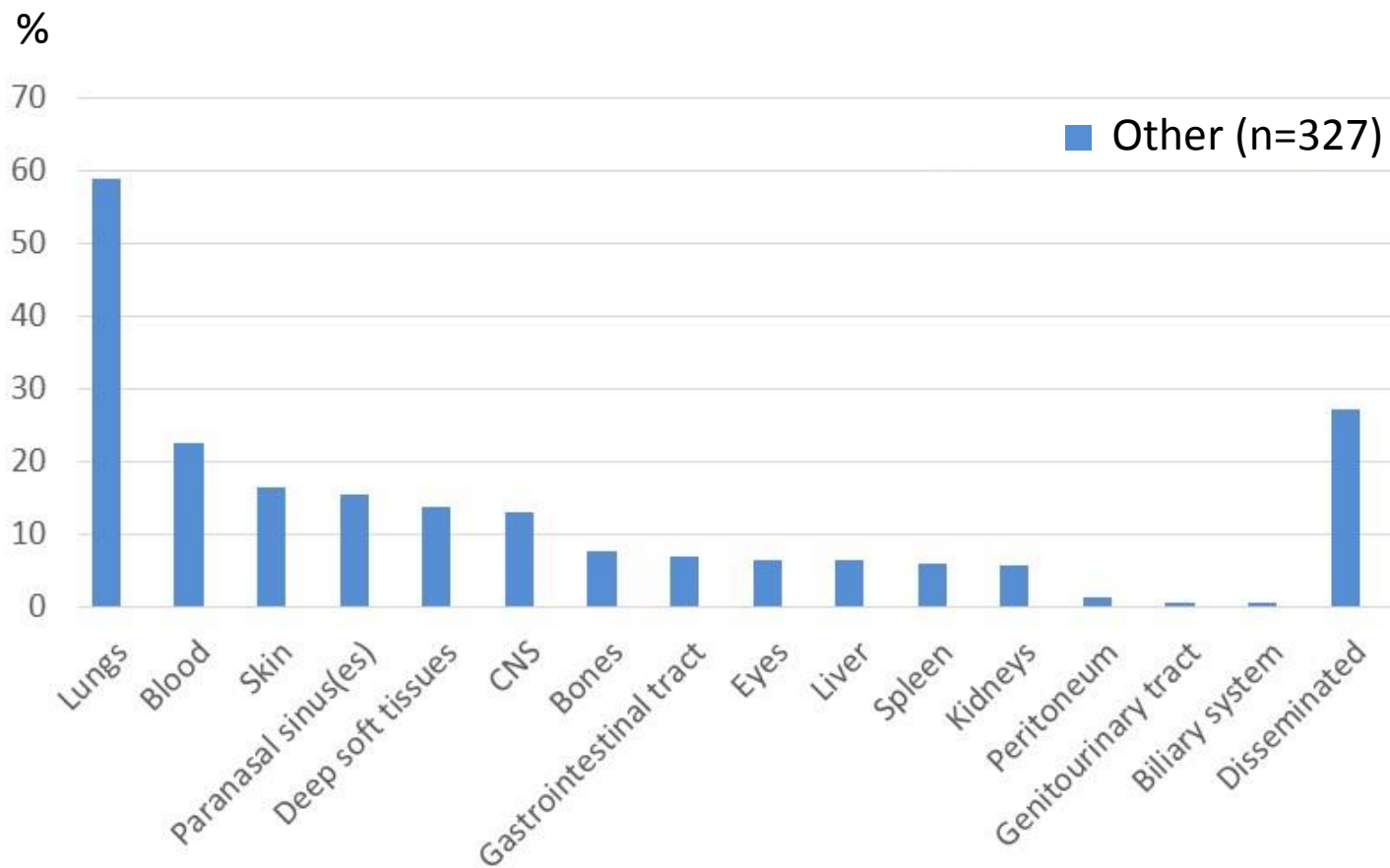
Risk Factors in 327 Cases (other than India)

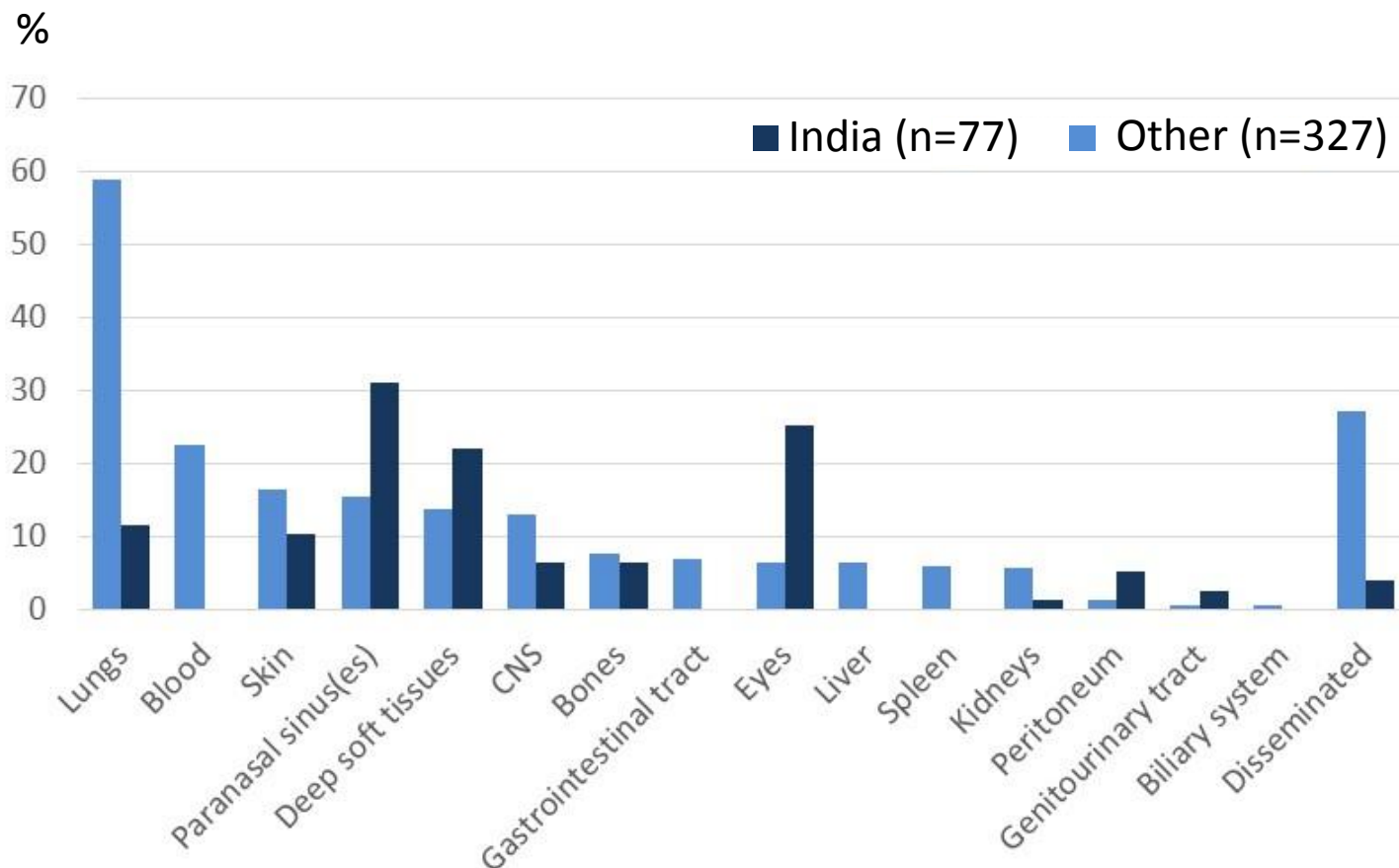


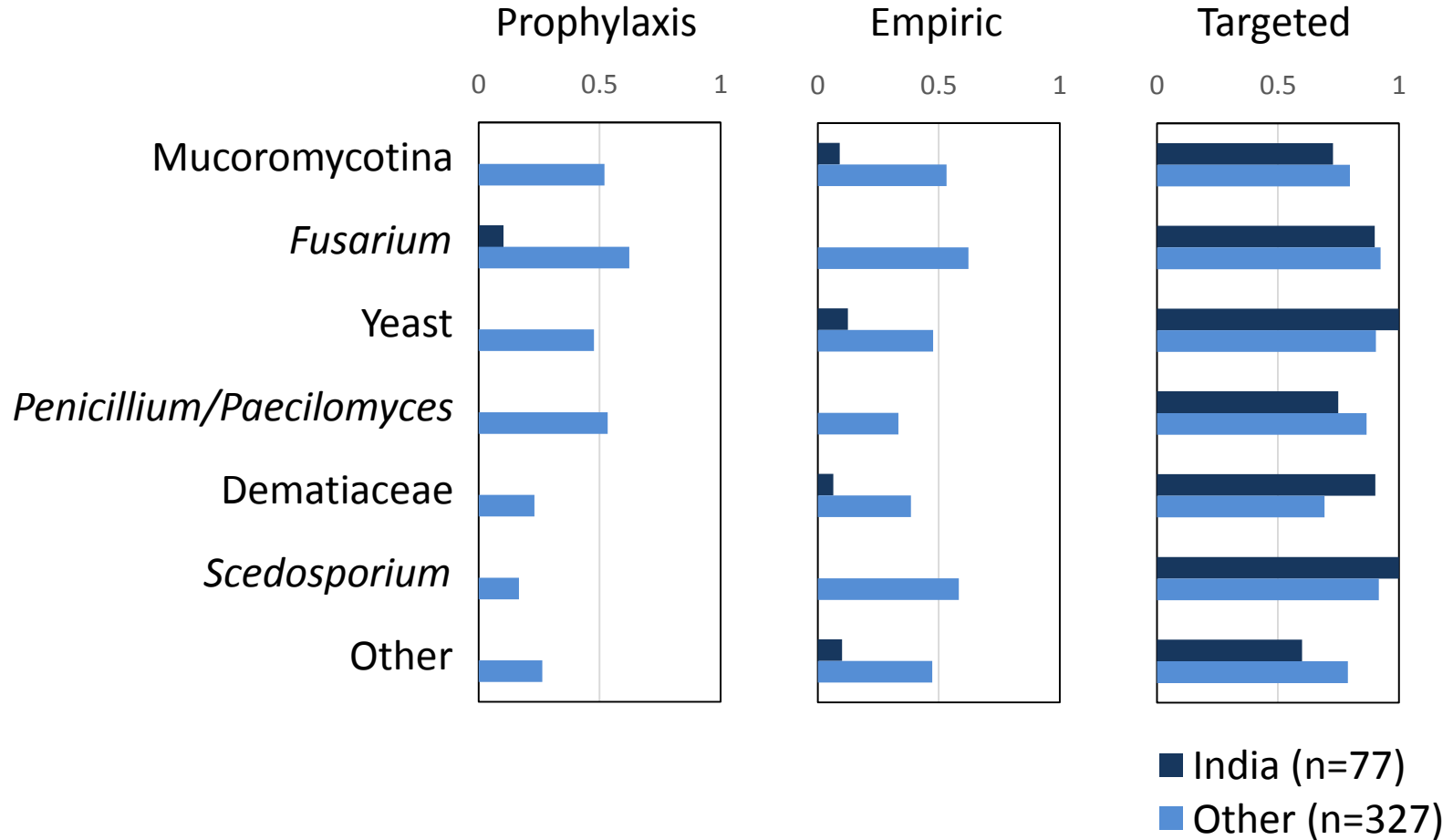
Risk Factors

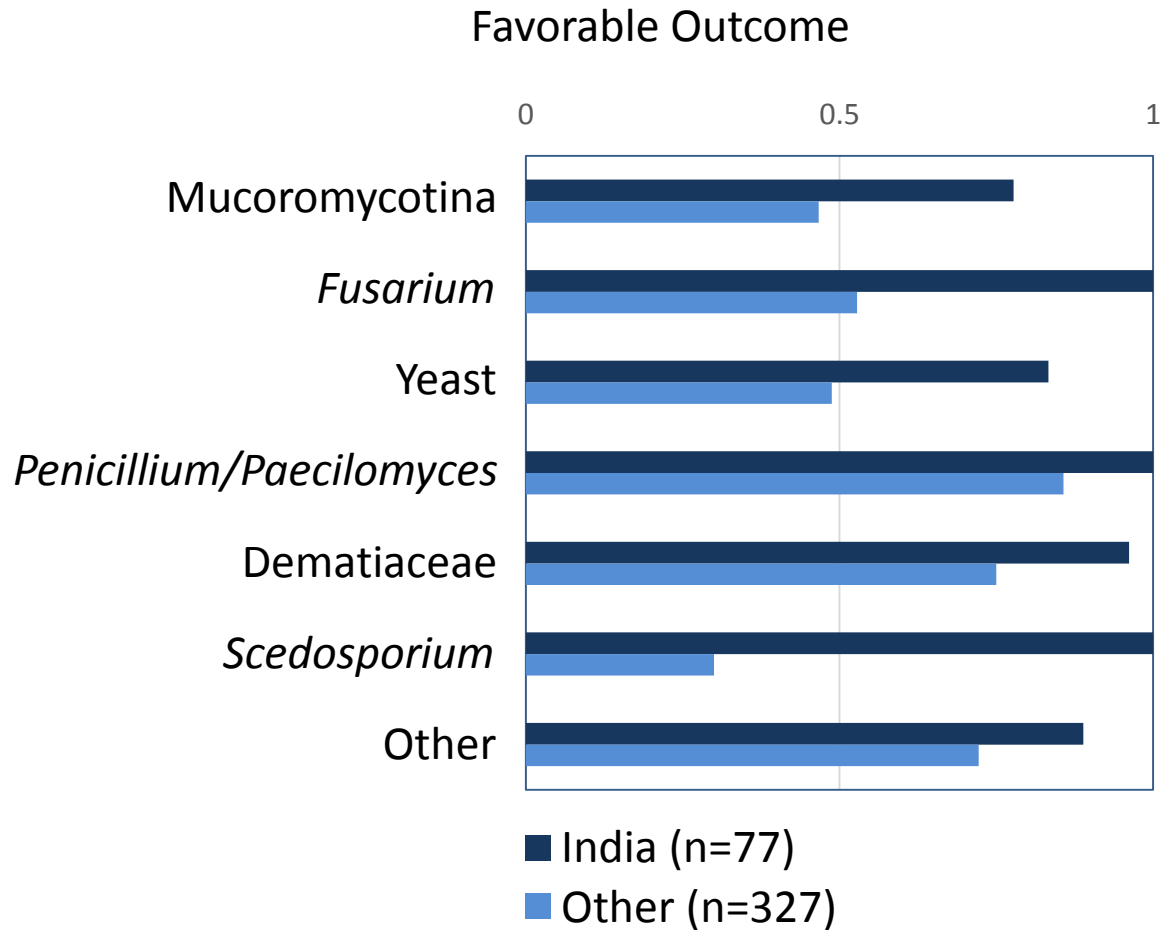


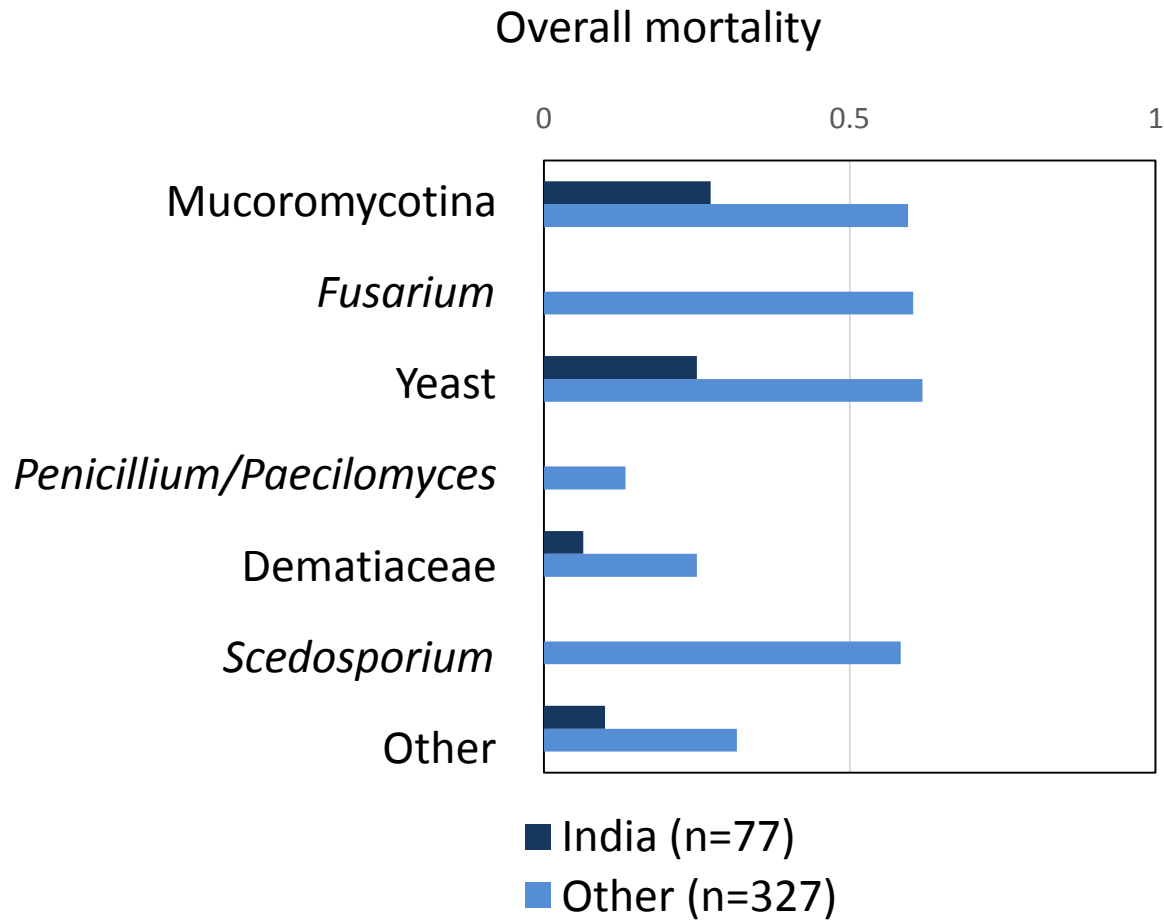
Site of Infection (other than India)













Fungiscope provides

- A platform for fruitful collaboration
- Efficient method for collecting patient information
- Immediate diagnostic and therapeutic services



Global Emerging Fungal Infection Registry

Initiated in 2003

ISHAM and ECMM Working Group

www.fungiscope.net



The MSG
Mycoses Study Group



Paul-Ehrlich-Gesellschaft
für Chemotherapie e.V.
www.p-e-g.org



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F. Farowski



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Become a Fungiscope Collaborator



Global Emerging Fungal Infection Registry

Initiated in 2003

ISHAM and ECMM Working Group

www.fungiscope.net



Send an Email to register@fungiscope.net
to contribute your rare cases of invasive fungal infection

*e.g. Acremonium, Alternaria, Bipolaris,
Cladosporium, Cryptococcus other than
neoformans, Curvularia, Exophiala,
Fusarium, Geotrichum, Paecilomyces,
Penicillium, Phialophora, Scedosporium,
Trichoderma, Trichosporon*