towards C management (63.5%, 787/1239). A significant amount of that usage was directed towards C prophylaxis at both Hospital A and B (67.4% (234/347) and 75% (330/440), respectively). In addition, fluc usage directed towards empiric C management was higher at Hospital A versus Hospital B (18.4% (64/347) versus 9.5% (42/440), respectively). Further patient data for the empiric C group is shown in Table 2.

Table 1: Patient information from Hospital A and Hospital B

	Hospital A (%)	Hospital B (%)
Patients	573	666
Age (Mean)	54	52
Male	273 (47.6)	354 (53.2)
Diabetes mellitus	176 (30.7)	266 (39.9)
Coronary artery disease	70 (12.2)	80 (12)
Congestive heart failure	77 (13.4)	41 (6.2)
Chronic kidney disease	148 (25.8)	98 (14.7)
ESRD	57 (9.9)	132 (19.8)
COPD	47 (8.2)	47 (7.1)
Asthma	19 (3.3)	25 (3.8)
SOT	215 (37.5)	322 (48.3)
Malignancy	150 (26.1)	105 (15.8)
Rheumatology diagnosis	47 (8.2)	70 (10.5)
Cirrhosis	24 (4.1)	76 (11.4)
HIV	16 (2.8)	29 (4.4)
CCI ≥ 3	356 (62.1)	436 (65.5)
Coccidioidomycosis - directed management	347 (60.6)	440 (66.1)
• Empiric	64	42
• Targeted	49	68
• Prophylaxis	234	330

Abbreviations: ESRD= End-stage renal disease; COPD= Chronic obstructive lung disease; SOT= Solid organ transplant recipient; HIV= Human immunodeficiency virus; CCI= Charlson comorbidity index

Table 2: Patient information for Fluconazole Utilization Directed Towards Empiric Coccidioidomycosis Management at Hospital A and Hospital B

	Hospital A (%)	Hospital B (%)
Patients	64	42
Diabetes mellitus	14 (21.9)	16 (38.1)
COPD	12 (18.8)	5 (11.9)
SOT	4 (6.3)	6 (14.3)
Malignancy	14 (21.9)	6 (14.3)
ESRD	5 (7.8)	5 (11.9)
Chronic kidney disease	3 (4.7)	6 (14.3)
Cirrhosis	2 (3.1)	3 (7.1)
Rheumatology diagnosis	8 (12.5)	4 (9.5)
CCI ≥ 3	37 (57.8)	25 (59.5)

Abbreviations: ESRD= End-stage renal disease; COPD= Chronic obstructive lung disease; SOT= Solid organ transplant recipient; CCI= Charlson comorbidity index

Conclusion: We report the results of a descriptive study that demonstrate that 63.5% of fluc usage in adults at two academic medical centers in Arizona was directed for C management. In addition to traditional fluc targets for AS, our study highlights C prophylaxis in solid organ transplant recipients and empiric C management as AS targets in endemic regions. These targets are especially important due to the risk for selection of azole-resistant *Candida* species and invasive molds with increased antifungal exposure.

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738. A Novel Molecular Diagnostic Assay for Identification of Fungal Pathogens

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Session: P-30. Eukaryotic Diagnostics

Background: A rapid and accurate diagnostic method for invasive fungal infections remains a critical clinical need. We recently reported a rapid molecular method for bacterial species identification directly from clinical samples that targets highly abundant ribosomal RNA on a multiplexed hybridization platform called NanoString. Here we report an adaptation of this assay that accurately distinguishes common fungal pathogens with limit of detection at a single yeast cell.

Methods: Building on our bacterial approach, we computationally designed specific hybridization probes targeting species-specific variable regions of fungal 18S and 28S rRNA from 12 clinically relevant fungi: *Aspergillus fumigatus*, *Cryptococcus neoformans*, and 10 *Candida* species, including *Candida auris*. Following mechanical lysis of crude specimens, fungi were detected from laboratory culture or artificial cerebrospinal fluid via multiplexed hybridization on a NanoString (Seattle, WA) instrument which yielded results within 7 hours from sample collection. Assay sensitivity was probed using serial dilutions of lysed C. albicans in culture, and cell-equivalents were confirmed by plating.

Results: Our hybridization probes targeting fungal rRNA specifically recognized all species tested to date: *A. fumigatus, C. neoformans,* and *C. albicans* with no cross-reactivity (Fig 1a). Serial dilutions of *C. albicans* lysate demonstrated a limit of detection around 0.1 cell equivalents without rRNA amplification (Fig 1b), capitalizing on the intrinsic abundance of rRNA in fungal cells.

Figure 1.

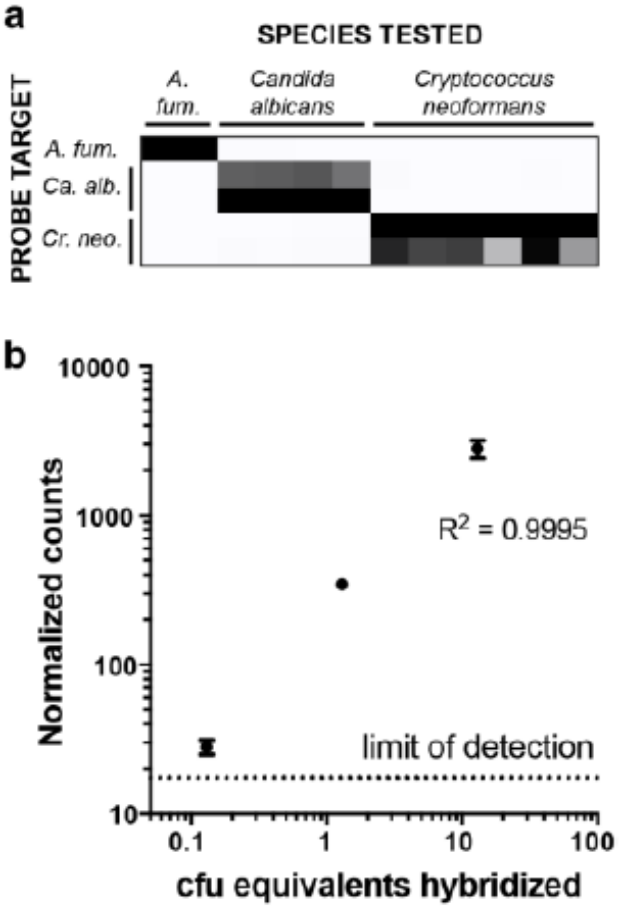

Figure 1. Specific, ultrasensitive yeast identification from crude lysates. (a) Probes targeting the rRNA of the fungi indicated on the vertical axis specifically recognize *A. fumigatus* gDNA, *C. albicans* in culture, and *C. neoformans* in artificial CSF. **(b)** Serial dilutions of *C. albicans* culture demonstrate detection of rRNA content from <1 yeast cell. Error bars = SEM from 3 replicates; limit of detection based on background from empty lysates.

Conclusion: We adapted a rapid, ultrasensitive hybridization-based diagnostic assay that has proven successful in bacteria, to fungi. Here we show the accurate detection of *Aspergillus, Cryptococcus,* and *Candida* species, including a computational design that will enable the distinction of 10 different Candida species, including *C. auris*, within hours from clinical specimen collection.

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739. A Two-Center Assessment of Histopathologic Diagnostic Performance for Fungal Organism Identification

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Session: P-30. Eukaryotic Diagnostics

Background: Accurate detection and identification of invasive fungal pathogens relies on concordance of several complementary laboratory techniques, including fungal culture, serology, and histopathologic identification. Histopathologic stains such as the Gomori methenamine silver stain (GMS) are used to highlight fungal cell wall in tissue specimens. We sought to determine the diagnostic performance of histopathology fungal stains as compared to fungal culture for diagnosis of invasive fungal tissue infection at tertiary medical centers with dissimilar patient populations.

Methods: We performed a retrospective review of all surgical pathology specimens with reported GMS results and concurrent fungal culture at Keck Medical Center (Keck) and Los Angeles County + USC Medical Center (LAC). Ratios of GMS diagnostic performance were compared using chi-squared analyses, with fungal culture as the gold standard for detection.

Results: Of 1347 LAC surgical pathology specimens stained with GMS to evaluate for fungal infection, 229 (17.0%) had concurrent tissue specimens submitted for fungal culture. Of 1546 Keck GMS-stained surgical pathology specimens, 358 (23.2%) had concurrent tissue for fungal culture. GMS stain performance at LAC showed a sensitivity of 53.7% (95% CI: 37.4-69.3%) and specificity of 90.4% (95% CI: 85.2-94.2%). At Keck, GMS showed a sensitivity of 64.1% (95% CI: 52.4-74.7%), specificity of 88.9% (95% CI: 84.7-92.4%), without significant difference in performance between sites, (p=0.27) and (p=0.62), respectively. Among filamentous fungi, GMS false negative frequency at LAC was 5.3% (10/190) and 4.0% (11/277) at Keck, without significant difference (p=0.51). A subset of pathology reports suggested the fungus genus based on histologic morphology. Of 10 LAC pathology specimens with fungal genus specified, 2 (20.0%) reports gave the incorrect genus and 8/18 (44.4%) reports at Keck gave incorrect genus as per concurrent culture isolate result.

Table 1. Diagnostic performance of GMS histopathology stain on surgical pathology specimens compared to tissue fungal culture at LAC and Keck Medical Centers from July 2015 through December 2018.

	LAC (95% Confidence interval)	Keck (95% Confidence interval)
Sensitivity	53.7% (37.4 - 69.3%)	64.1% (52.4 - 74.7%)
Specificity	90.4% (85.2 - 94.2%)	88.9% (84.7 - 92.4%)
Positive Predictive Value	55.0% (38.5 - 70.7%)	61.7% (50.3 - 72.3%)
Negative Predictive Value	89.9% (84.7 - 93.8%)	89.9% (85.7 - 93.2%)

Conclusion: GMS stain had low-to-moderate sensitivity when compared to fungal tissue culture. Increased submission of concurrent tissue for fungal culture is likely to improve detection. When genus level identification was attempted, fungal forms were incorrectly identified in about one-third of histopathology specimens.

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741. Antifungal Resistant *Candida glabrata* Are Most Commonly Colonized in *Clostridioides difficile* Infection (CDI) Patient Guts in Texas

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Session: P-30. Eukaryotic Diagnostics

Background: *Candida glabrata* is the second most common cause of invasive candidiasis in the United States. The echinocandin class of antifungals, including caspofungin has become the preferred therapy for invasive candidiasis due to *C. glabrata* and other species demonstrating decreased azole susceptibility. Caspofungin resistance has been uncommon, but reports suggest that the incidence is increasing, particularly among *C. glabrata* isolates. The dysbiosis associated with *Clostridium difficile* allows for overgrowth of *Candida* spp. However, the prevalence of *C. glabrata* in stool of C. difficile infection (CDI) patients is not well studied. Therefore, our objectives were to investigate the incidence of potentially pathogenic species of *C. glabrata* in stool samples of CDI patients.

Methods: We collected 1,241 *Clostridioides difficile* infection (CDI) patient stool samples from two large hospitals in Houston, Texas and enrich the samples in brain heart infusion (BHI) broth at 37C for 48-72 hours and then sub-cultured onto selective HardyChrom *Candida* agar and incubated at 37C for 48 to 72 hours. Characteristic *Candida* colonies were stocked in cryovials and kept at -80C for further analyses. Isolates were then identified by multiplex PCR. *C. glabrata* isolates were screened for caspofungin resistance on Muller-Hinton agar (with 8.0 ug/ml).

Results: Overall, 14.8% (184/1241) samples were culture positive for *Candida* spp. The predominant species was *C. glabrata* (9.2 %) followed by *C. albicans* (2.3%), *C. tropicalis* (1.6%), *C. parapsilosis* (1.2%), *C. krusei* (0.6%) or not speciated (6.9%). The majority of C. glabrata isolates (70.2%; 80/114) were caspofungin resistant.

Conclusion: The results of this study showed that colonization of *C. glabrata* is common in patients with CDI and could be a source of antifungal-resistant pathogens.

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742. Breakthrough Invasive Fungal Infections with Isavuconazonium Sulfate versus Voriconazole as Primary Antifungal Prophylaxis in Patients with Acute Myeloid Leukemia (AML) who Received Induction Chemotherapy

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Session: P-30. Eukaryotic Diagnostics

Background: Fungal infections in patients with hematologic malignancies are associated with high mortality. Primary antifungal prophylaxis has been shown to be a more effective strategy than treating a documented infection. This retrospective analysis aims to compare the rates of breakthrough invasive fungal infections in patients with acute myeloid leukemia (AML) who received induction chemotherapy and were prescribed voriconazole (Vori) or isavuconazonium (Isv) for primary antifungal prophylaxis.

The European Organization for Research and Treatment of Cancer/ Invasive Fungal Infection Cooperative Group and National Institute of Allergy and Infectious Diseases Mycoses Study Group criteria was used to categorize incidence of breakthrough invasive fungal infections bIFI into 'possible', 'probable' or 'definite' groups who required treatment with liposomal amphotericin B, echinocandin, and/or different triazole.

Methods: This is a single-center retrospective analysis of patients who underwent induction chemotherapy for newly diagnosed AML. These patients received either Vori or Isv sulfate as the primary antifungal prophylaxis at Moffitt Cancer Center between July 2017 and June 2019. Patients who were over 18 years old and received at least 10 days of uninterrupted primary antifungal prophylaxis with either Vori or Isv sulfate were included in the study. Patients with a history of stem cell or solid organ transplant, Human Immunodeficiency Virus, relapsed AML or who received systematic antifungal, other than fluconazole, therapy within 30 days to induction chemotherapy were excluded.

Results: 250 patients were screened for the study and out of which 118 patients met the above criteria. There was a 20.2% (18/89) break through rate of fungal infections in the Vori arm and 17.2% (5/29) in the Isv arm. In the Vori arm there were 15 possible bIFIs, 3 probable bIFIs and 0 definite bIFIs. In the Isv arm there are 2 possible bIFIs, 2 probable bIFIs and 1 definite bIFIs.

Conclusion: There is no significant statistical difference (Using the Fisher Exact test statistic p=1) between the Isv and Vori in patients who received these agents for primary fungal prophylaxis for induction chemotherapy for AML at Moffitt Cancer Center between July 2017 - June 2019.

Disclosures: **Rod Quilitz, Pharm D.**, **Astellas** (Advisor or Review Panel member)

743. Characteristics of Candidemia in a Coccidioidomycosis Endemic Region: The impact of Increased Azole Use in the Selection of *Candida* species

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Session: P-30. Eukaryotic Diagnostics

Background: The incidence of invasive candidiasis secondary to non-albicans *Candida* species is on the rise. In Arizona, azoles are used for coccidioidomycosis treatment and prophylaxis in immunosuppressed population. Therefore, we intended to describe the characteristics and outcomes of non-albicans Candidemia in our area.

Methods: We conducted an IRB approved multicenter study evaluating patients from October 1, 2017 to January 1, 2020. Patient demographics, medical history, procedures, antifungal use, and laboratory data were collected. Episode per patient was included in the statistical analysis.

Results: In the study period, there were 145 patients with 151 candidemia episodes. For the episode-per-patient, median age was 51 (IQR 37-62), 45% were female, and 86% were Caucasian. 10% had a history of transplantation (40% HSCT and 60% SOT), and 22.5% had a history of cancer. 78% had another concomitant systemic infection. 4/80 (5%) and 12/102 (12%) had infective endocarditis. Only 5 (3.3%) had a history of coccidioidomycosis and 37 (24.5%) had exposure to azole therapy in the prior 3 months. 60% of the candidemia episodes were due to non-albicans *Candida* species, 27/37 (73%) had a prior history of azole therapy, 12/15 (80%) were transplant recipients, and 23/34 (80%) had cancer. The majority (71%) of patients initially received an echinocandin without a significant difference in mortality. Of all the admission episodes, there were 45/151 (29%) deaths and 7/151 (4.5%) were discharged to hospice. Not removing central catheters was associated with 60% of deaths (P=0.002). Infectious diseases consult was associated with lower mortality (OR 0.25, 95% CI 0.087-0 .70) and higher rates of catheter removal (OR 8, 95% 2.2-29.5). There was no difference in mortality between non-albicans versus albicans Candidemia (28.6% vs. 32%, P=0.7).

Conclusion: Our study found higher rates of non-albicans Candidemia that are more eminent in transplant recipients and those with prior azole use, but this was not statistically significant. The removal of the central line and ID consultations was associated with a significant reduction in mortality. In Coccidioidomycosis endemic regions,