

Assessing the sensitivity of the 1,3,Beta-D-Glucan (BDG) serum test in confirmed Pneumocystis Pneumonia (PCP), Invasive Candidaemia (IC) and Candida-colonised line-tips. How well can we rely upon the BDG test to indicate infection in these fungal groups?

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Background:

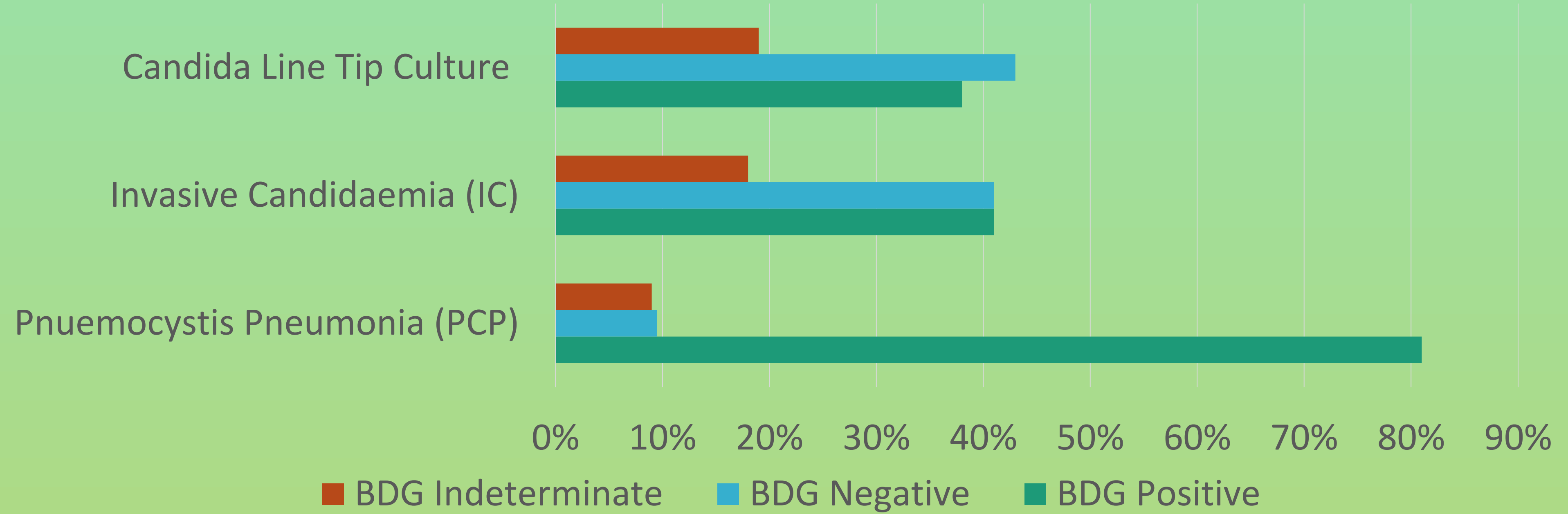
The Beta-D-Glucan (BDG) serum test is a relatively straightforward and widely utilised test used to indicate underlying fungal infection. Despite this, the clinical implications of a negative BDG result is often poorly understood by clinicians. Since the test sensitivity can vary significantly between patient populations and pathologies, it can seem unclear whether a negative test should be used to rule out fungal infection.

Objectives:

Primary: Assess in-house BDG testing for: confirmed cases of Invasive Candidaemia (IC), indwelling line-tip colonised Candida, and Pneumocystis Pneumonia (PCP) to evaluate the test sensitivity.

Secondary: Assess BDG test sensitivity in IC and line-tip colonized Candida, comparing findings when the cultured organism is *C. albicans* versus non- *C. albicans*.

BDG result for patients with a positive Candida line tip culture, Candida blood culture or Pneumocystis Pneumonia PCR



Methods:

- Data retrospectively collected from patients in Barts Health Trust with a positive Candida blood culture, Candida line tip culture or a positive PCP PCR result between December 2020 – February 2022.
- Data collected from Electronic Patient Healthcare Records and electronic drug charts.
- The in-house BDG test analysed in the study is the Fujifilm Wako 1,3,Beta-D-Glucan (BDG) used in the Royal London Hospital microbiology laboratory.
- 188 patients were included in the study in total – 23 PCP cases, 67 IC cases and 98 line-tip candida positive cases
- When assessing the primary objective, patients were required to have had a BDG test within two weeks either side of their confirmatory fungal test (ie. culture or PCR).

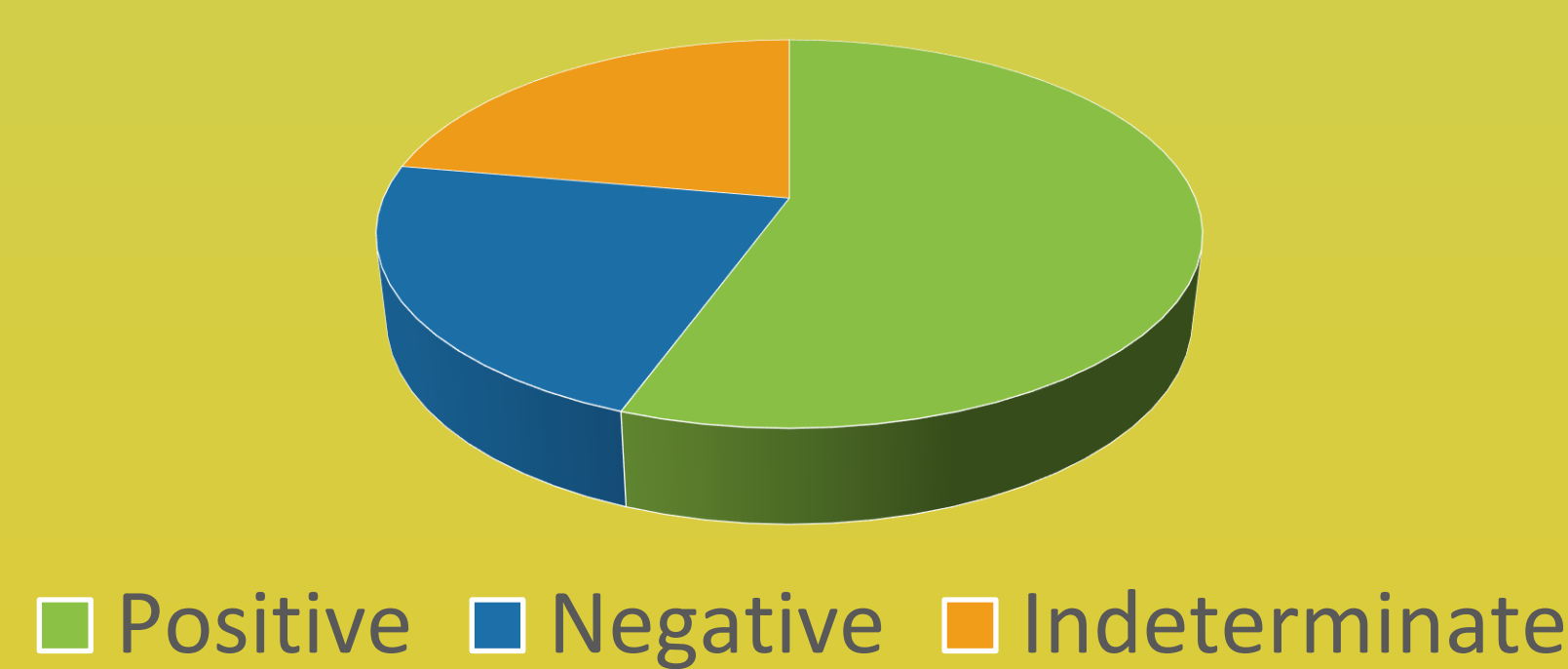
Results:

- For positive PCP PCR patients, BDG test sensitivity: 81%. (Note that most of the negative/indeterminate PCP cases did not receive treatment)
- For confirmed IC, BDG test sensitivity: 41%
- For positive line-tip candida culture, BDG test sensitivity: 38%
- For *C. albicans* IC (no. patients: 9), BDG test sensitivity: 56%
- For Non-*C. albicans* IC (no. patients: 19) BDG test sensitivity: 33%
- For line-tip positive *C. albicans* (no. patients: 18) BDG test sensitivity: 38%.
- For line-tip positive Non-*C. albicans* (no. patients: 39) BDG sensitivity: 37%

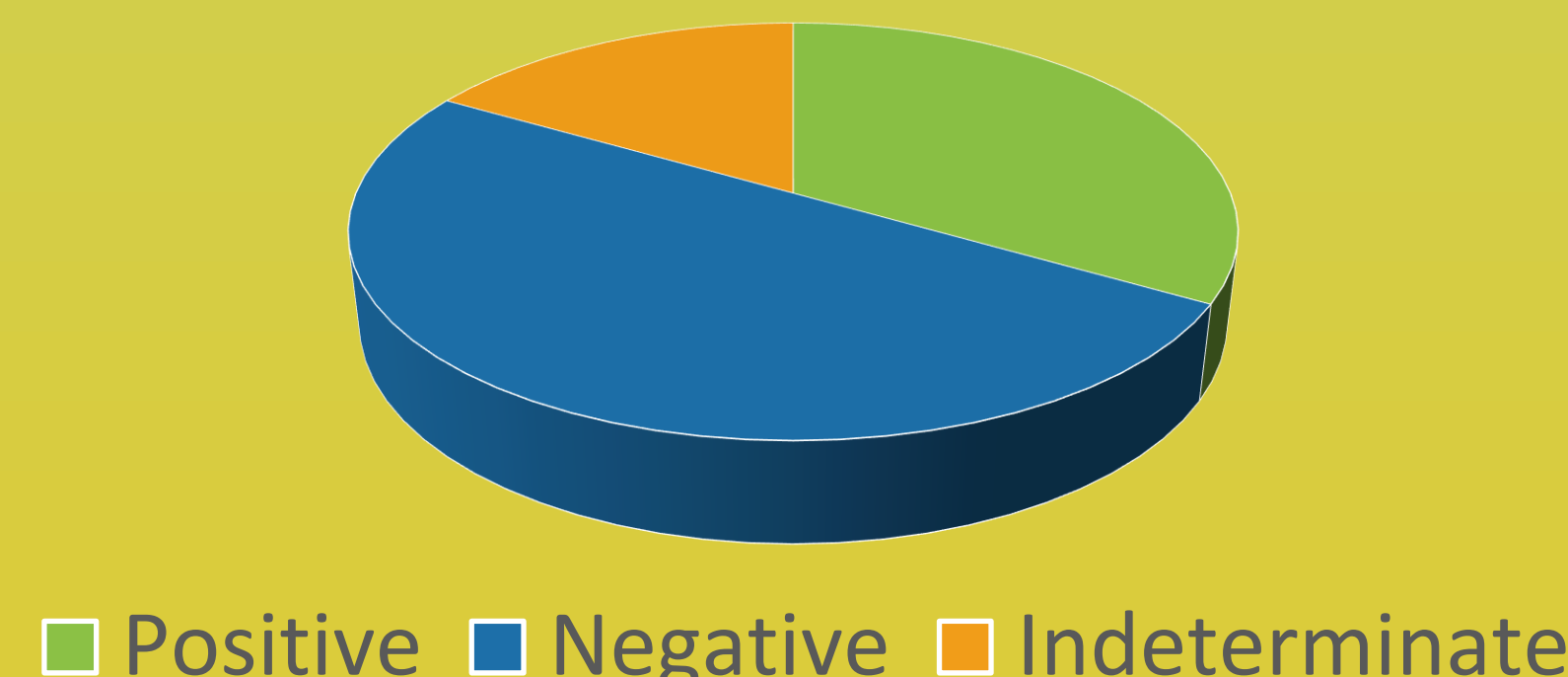
Of note:

- 9% of PCP cases did not have a BDG test within 2 weeks of confirmatory PCR
- 41% of Candida-colonised line-tip cases did not have a BDG test within 2 weeks of confirmatory culture
- 60% of IC cases did not have a BDG test within 2 weeks of confirmatory culture.

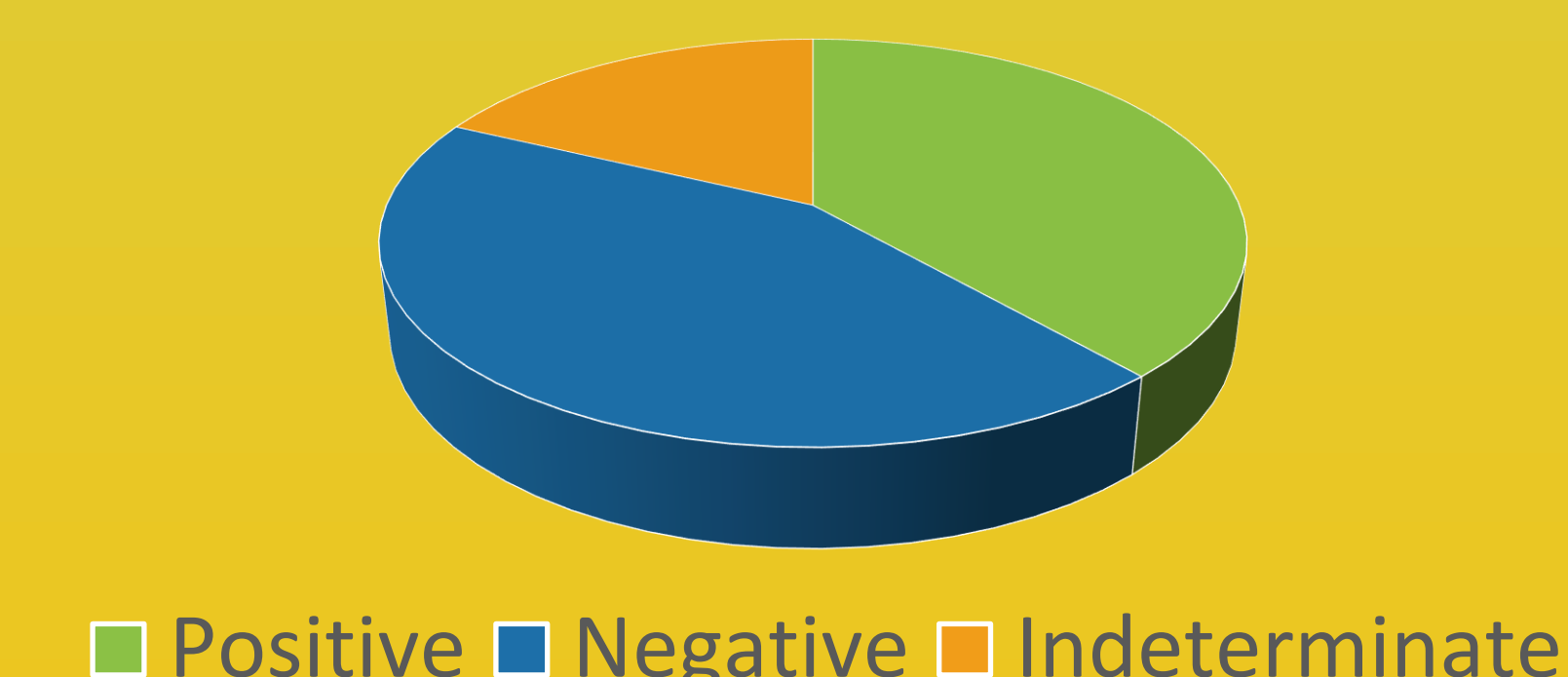
BDG result in *C. Albicans* Blood Culture



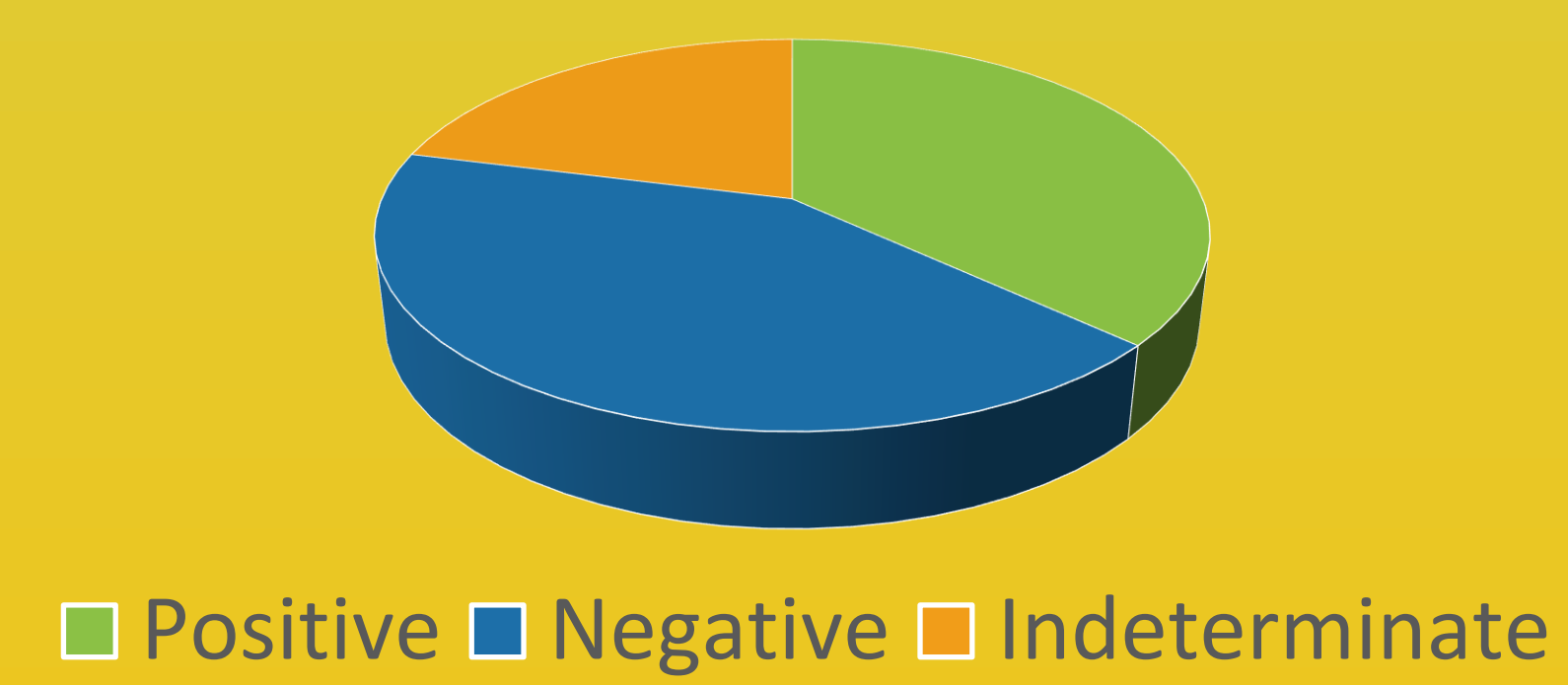
BDG result in Non-*C. Albicans* Blood Culture



BDG result in *C. Albicans* Line Tip Culture



BDG result in Non-*C. Albicans* Line Tip Culture



Conclusions:

- These findings correlate with current research that BDG is a useful rule-out test in in PCP.
- Whereas with regards to IC, the results indicate that a negative BDG test should not used to rule out an IC diagnosis. This contrasts with current literature which indicates the test can be used in certain populations to aid with ruling out IC.
- Many patients with underlying fungal infection did not receive a recent BDG test, reasons for this likely multi-factorial.
- The BDG test had a higher sensitivity in IC for *C. albicans* than non- *C. albicans* organisms, a future study with larger sample sizes would be useful to study this finding further.