

ARTEMIS Disk Global Antifungal Surveillance Study

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Annual Summary Report Czech Republic

2001-2004 Voriconazole Data
1998-2004 Fluconazole Data

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Note: Additional analysis is available on request. Contact Vance Newell, Giles Scientific at pfizer@biomic.com for more information.

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Introduction

The CLSI (formerly NCCLS) M44-A antifungal disk diffusion test method for voriconazole and fluconazole provides a low cost, reproducible, and accurate standard susceptibility test that can be easily used in hospital laboratories. This method can help to guide clinical therapy and to provide well-controlled quantitative data for epidemiology analysis.

Previous studies presented by Meis (31), Bille (2), Barry (1), Liebowitz (34), Pfaller (35) and Hazen (36) have evaluated this new disk test method and showed that it provided a reproducible and accurate means to assess in vitro susceptibility of yeast isolates. The CLSI M44 disk method in this study utilized a 0.5 McFarland turbidity inoculum standard and incubation at 35°C for 20-24 hours, similar to the CLSI M2 bacterial test method, however, the Mueller-Hinton was supplemented with 2% glucose and 0.5 µg/ml methylene blue.

A good correlation was shown by Barry (33) between the standard reference CLSI broth method (7) and the disk method used in this study. The CLSI antifungal subcommittee met in January 2003 and the M44-A Method was published in 2004 including approved interpretive and QC guidelines for fluconazole. Interpretive guidelines for voriconazole were reviewed by the CLSI in January 2005 and tentative breakpoints were approved. The voriconazole breakpoints are tentative for a period of 1 year.

The **BIOMIC** Systems (26) utilized in this study provided a highly cost-effective means to electronically read test plates and to collect well controlled quantitative data on a high number of unselected isolates representing a broad range of all yeast species encountered in clinical laboratories globally. The BIOMIC eliminated paper work and transcription errors, and provided greater consistency at and between sites.

This study provided insight into the activity of voriconazole and fluconazole with routine clinical hospital isolates. Analysis of this data over time and by country, hospital, specimen type and in-hospital location enabled identification of patterns that are useful to clinicians, microbiologists and Pfizer.

Method and Materials

Sites

One hundred thirty (130) institutions in 39 countries contributed data on 175,800 yeast isolates during the entire study from June 1997 through December 2004 (Pfizer FCA-NY-96-005 / ARTEMIS Disk study). Eighty-seven (87) institutions in 33 countries tested a total of 34,925 yeast isolates during 2004. One hundred twenty (120) institutions in 35 countries tested a total of 118,125 yeast isolates from 2001 through 2004. Appendix II lists all sites that contributed data from June 1997 through December 2004. This report contains data from two sites in the Czech Republic.

Isolates Tested

All investigators tested all clinical yeast isolated in their clinical laboratories that were considered to be pathogens from all body sites and all locations in-hospital during the study period. Selected sites also tested bacterial isolates with their standard antibacterial agents.

Method

The CLSI M44 disk method was used to test all yeast isolates. The M44 method is similar to the CLSI M2 disk method for bacteria (6) but the Mueller-Hinton agar was supplemented with 2% glucose and 0.5 µg/ml methylene blue. Mueller-Hinton agar media was sourced locally at all sites. Inoculum was adjusted to match a 0.5 McFarland density standard. Plates were incubated for 20-24 hours at 35-37 degrees Celsius. Slow growing isolates, primarily *Cryptococcus*, could be read after 48 hours incubation.

Pfizer supplied all sites with 25µg fluconazole disks, 1µg voriconazole disks (Becton Dickinson, Sparks, MD) and quality control (QC) strain *C. albicans* ATCC 90028. ATCC 90028 has an acceptable performance range of 28-39 mm for fluconazole and 31-42 mm for voriconazole; an optional QC strain: *C. parapsilosis* ATCC 22019 has a range of 22-33 mm for fluconazole and 28-37 for voriconazole.

Interpretive breakpoints for fluconazole disk tests were based on zones that correlated with CLSI recommended category breakpoints for the reference broth dilution method (5, 7). Fluconazole breakpoints were: S = 8 µg/ml, SDD =16-32 µg/ml, and R = 64 µg/ml. Quality Control tests were required to be acceptable within 7 days of testing. In January 2002, the CLSI issued formal fluconazole disk interpretive criteria of = 19mm = S, 15-18mm=SDD, and =14mm=R.

Interpretive guidelines for voriconazole were reviewed by the CLSI in January 2005 and tentative breakpoints were approved. The voriconazole breakpoints are tentative for a period of 1 year. The tentative Voriconazole breakpoints are = 17mm = S, 14-16mm=SDD, and =13mm=R.

All yeast and bacteria disk test results were read by electronic image-analysis and interpreted and recorded with a **BIOMIC** Plate Reader System (26). All test results were sent by Email to Giles Scientific for analysis (approximately every 3 months). Zone diameter, susceptibility category (S, SDD/I, R), MIC, and QC test results were recorded electronically. Patient and doctor names, duplicate test results (same patient-same species-same biotype results) were automatically eliminated prior to analysis. Uncontrolled test results were automatically eliminated from analysis.

Country Results Summary - 2004

The first section of this report focuses on the combined ARTEMIS Disk Data from 2001-2004 and includes fluconazole and voriconazole test results. Voriconazole category (S, SDD, R) results are based on the new tentative CLSI breakpoints.

The second section focuses on trends in the 4 year (2001-2004) voriconazole data, and in the 7.5 year (1997-2004) fluconazole data.

There were a total of 1227 fluconazole disk results and 1227 voriconazole disk results reported during 2004 at two sites in the Czech Republic. For the 2001-2004 period, there were a total of 5663 fluconazole disk results and 5307 voriconazole disk results reported at two sites in the Czech Republic. (Tables 1-10 and Figures 1-4)

Over the entire study period (1998-2004), there were a total of 9076 fluconazole results reported at two sites in the Czech Republic (Tables 11-12).

Part 1: Combined 2001-2004 Data

Voriconazole MIC 50/90 and susceptibility results by species are shown in **Table 1**. Interpretation is based on tentative CLSI guidelines. MICs are determined by regression analysis.

Fluconazole MIC 50/90 and susceptibility results by species are shown in **Table 2**.

Voriconazole MIC 50/90 and susceptibility results for fluconazole resistant isolates by species are shown in **Table 3**. This table shows the voriconazole susceptibility patterns for isolates that are resistant to fluconazole.

Voriconazole and Fluconazole MIC 50/90 and susceptibility results by Institution for all yeast are shown in **Table 4** and **Table 5**.

Voriconazole and Fluconazole MIC 50/90 and susceptibility results by Specimen Type for all yeast are shown in **Table 6** and **Table 7**.

Voriconazole and fluconazole MIC 50/90 and susceptibility results by In-Hospital Location for all yeast are shown in **Table 8** and **Table 9**.

Zone Diameter Distribution Graphs for both voriconazole and fluconazole are shown in **Figures 1 (voriconazole) and 2 (fluconazole)** for all yeast.

Quality Control Zone Diameter Distributions for *C. albicans* are shown in **Figure 3** for voriconazole and **Figure 4** for fluconazole.

Part 2. Trends

A Four-Year Comparison of Voriconazole Resistance by Species is shown in **Table 10**. Percent resistant and count is shown for each Year/Species.

Fluconazole resistance trends by species for the seven-year period are shown in **Table 11**.

Yeast Isolation rates by Species for the seven-year period are shown in **Table 12**.

Country Results Tables and Charts

Part 1: Combined 2001-2004 Data

- Table 1 Voriconazole MICs and Interpretation by Species
Table 2 Fluconazole MICs and Interpretation by Species
Table 3 Susceptibility to Voriconazole for Fluconazole Resistant Isolates
- Table 4 Voriconazole MICs and Interpretation by Institution for All Yeast
Table 5 Fluconazole MICs and Interpretation by Institution for All Yeast
Table 6 Voriconazole MICs and Interpretation by Specimen Type for All Yeast
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- Figure 1 Fluconazole Zone Diameter Distribution with All Yeast
Figure 2 Voriconazole Zone Diameter Distribution with All Yeast
Figure 3 Voriconazole QC Zone Diameter Distribution with *C. albicans* ATCC 90028
Figure 4 Fluconazole QC Zone Diameter Distribution with *C. albicans* ATCC 90028

Part 2: Trends

- Table 10 Four-Year Comparison of Voriconazole Susceptibility by Species
Table 11 Seven Year Comparison of Fluconazole Susceptibility by Species
Table 12 Seven Year Comparison of Isolation Rate by Organism

Table 1. Voriconazole MICs and Interpretation by Species for Czech Republic

Organism	% S	% SDD	% R	MIC 50	MIC 90	N
<i>Candida albicans</i>	99.9		0.1	0.02	0.10	3,154
<i>Candida tropicalis</i>	87.8	9.9	2.4	0.27	1.16	637
<i>Candida glabrata</i>	69.8	12.4	17.8	0.80	2.44	523
<i>Candida krusei</i>	70.6	16.6	12.7	0.76	2.15	385
<i>Candida parapsilosis</i>	100.0			0.02	0.10	226
<i>Trichosporon</i> sp.	90.1	6.3	3.6	0.15	1.05	111
<i>Candida lusitanae</i>	100.0			0.02	0.22	49
<i>Saccharomyces cerevisiae</i>	93.8	6.3		0.08	0.69	48
<i>Candida inconspicua</i>	93.8	6.3		0.10	0.68	48
<i>Candida kefyr</i>	100.0			0.02	0.07	30
<i>Candida famata</i>	88.9	11.1		0.27	1.16	27
<i>Candida guilliermondii</i>	95.8	4.2		0.23	0.85	24
<i>Trichosporon mucoides</i>	100.0			0.11	0.26	12
<i>Candida rugosa</i>	83.3	16.7		0.05	1.16	6
<i>Blastoschizomyces capitatus</i>	60.0	20.0	20.0	0.33	2.64	5
<i>Trich. beigeli / cutaneum</i>	80.0	20.0		0.41	1.75	5
<i>Candida lipolytica</i>	75.0		25.0	0.14	2.64	4
<i>Candida species</i>	100.0			0.14	0.76	4
Other Yeast	100.0			0.12	0.41	3
<i>Candida norvegensis</i>	100.0			0.18	0.94	3
<i>Candida zeylanoides</i>	100.0			0.01	0.01	1
<i>Cryptococcus neoformans</i>	100.0			0.02	0.02	1
<i>Trichosporon asahii</i>	100.0			0.03	0.03	1
Total	92.9	4.0	3.1			5,307

All Specimen Types, All Locations in Hospital, 2001-2004 Data.
Breakpoints Based on Tentative CLSI Guidelines.

Table 2. Fluconazole MICs and Interpretation by Species for Czech Republic

Organism	% S	% SDD	% R	MIC 50	MIC 90	N
<i>Candida albicans</i>	99.6	0.2	0.2	0.87	3.90	3,385
<i>Candida tropicalis</i>	97.2	2.7	0.1	3.04	13.58	674
<i>Candida glabrata</i>	44.8	27.4	27.8	28.73	>165	540
<i>Candida krusei</i>	2.2	5.9	91.9	>165	>165	408
<i>Candida parapsilosis</i>	98.8	1.2		1.12	6.42	243
<i>Trichosporon</i> sp.	68.5	9.7	21.8	8.24	100.12	124
<i>Candida lusitanae</i>	94.3	3.8	1.9	1.12	14.01	53
<i>Saccharomyces cerevisiae</i>	82.7	9.6	7.7	3.47	48.82	52
<i>Candida inconspicua</i>	24.5	38.8	36.7	47.34	128.52	49
<i>Candida kefyr</i>	100.0			0.37	1.64	32
<i>Candida famata</i>	48.3	27.6	24.1	28.73	128.52	29
<i>Candida guilliermondii</i>	58.3	29.2	12.5	11.93	78.00	24
<i>Trichosporon mucoides</i>	75.0	25.0		9.41	28.73	12
<i>Candida rugosa</i>	66.7	33.3		2.37	28.73	6
<i>Blastoschizomyces capitatus</i>	80.0		20.0	10.58	>165	5
<i>Trich. beigeli / cutaneum</i>	20.0	40.0	40.0	36.88	>165	5
<i>Candida lipolytica</i>	75.0	25.0		5.30	60.76	4
<i>Candida species</i>	75.0	25.0		2.63	47.34	4
Other Yeast	100.0			3.47	5.00	4
<i>Saccharomyces</i> sp.	75.0	25.0		1.95	47.34	4
<i>Candida norvegensis</i>	66.7	33.3		8.24	47.34	3
<i>Candida zeylanoides</i>	100.0			1.44	1.44	1
<i>Cryptococcus neoformans</i>		100.0		47.34	47.34	1
<i>Trichosporon asahii</i>	100.0			1.44	1.44	1
Total	84.8	4.7	10.5			5,663

All Specimen Types, All Locations in Hospital, 2001-2004 Data.

MIC Test Range <0.25 to >165 mcg/ml

Table 3. Voriconazole Susceptibility of Fluconazole Resistant Isolates

Organism	% S	% SDD	% R	MIC 50	MIC 90	N
<i>Candida albicans</i>	50.0		50.0	1.46	4.92	6
<i>Candida tropicalis</i>			100.0	3.25	3.25	1
<i>Candida glabrata</i>	12.1	21.6	66.4	2.44	>8.0	116
<i>Candida krusei</i>	68.1	16.8	15.1	0.76	2.64	304
<i>Trichosporon</i> sp.	60.0	24.0	16.0	0.94	2.40	25
<i>Saccharomyces cerevisiae</i>	50.0	50.0		0.96	1.75	2
<i>Candida inconspicua</i>	83.3	16.7		0.18	1.42	18
<i>Candida famata</i>	57.1	42.9		0.94	1.75	7
<i>Candida guilliermondii</i>	66.7	33.3		0.94	1.42	3
<i>Blastoschizomyces capitatus</i>			100.0	2.64	2.64	1
<i>Trich. beigeli</i> / <i>cutaneum</i>	50.0	50.0		1.18	1.75	2
Total	54.0	18.8	27.2			485

All Specimen Types, All Locations in Hospital, 2001-2004 Data, Czech Republic.

Fluconazole Resistant Isolates Only. Breakpoints Based on Tentative CLSI Guidelines.

Table 4. Voriconazole MICs and Interpretation for All Yeast - Czech Republic

Institution	% S	% SDD	% R	MIC 50	MIC 90	N
Ceske Budejovice	92.4	3.9	3.7	0.05	0.80	4,092
Hygienicka Stanice	94.5	4.4	1.2	0.01	0.80	1,215
Total	92.9	4.0	3.1			5,307

All Specimen Types, All Locations in Hospital, 2001-2004 Data.
Breakpoints Based on Tentative CLSI Guidelines.

Table 5. Fluconazole MICs and Interpretation for All Yeast - Czech Republic

Institution	% S	% SDD	% R	MIC 50	MIC 90	N
Ceske Budejovice	85.9	3.8	10.3	1.44	78.00	4,448
Hygienicka Stanice	80.7	7.8	11.4	0.53	100.12	1,215
Total	84.8	4.7	10.5			5,663

All Specimen Types, All Locations in Hospital, 2001-2004 Data.
MIC Test Range <0.25 to >165 mcg/ml

Table 6. Voriconazole MICs and Interpretation by Specimen Type for All Yeast

Specimen Type	% S	% SDD	% R	MIC 50	MIC 90	N	%
Biliary Tract	70.0	10.0	20.0	0.11	2.12	10	0.2%
Blood	96.7	1.6	1.6	0.01	0.51	183	3.4%
CSF	100.0			0.04	0.04	1	0.0%
Genital	96.6	2.7	0.8	0.05	0.27	264	5.0%
Lower G.I.	89.5	3.2	7.4	0.03	1.47	95	1.8%
Lower Resp. Tract	93.0	4.0	3.1	0.05	0.94	1,463	27.6%
Misc. / Other	96.0	2.7	1.3	0.03	0.72	374	7.0%
Misc. Fluids	94.2	1.9	3.8	0.04	0.85	52	1.0%
Skin / Soft Tissue	94.5	2.8	2.7	0.05	0.62	640	12.1%
Upper Resp. Tract	91.9	4.1	4.1	0.05	0.94	1,477	27.8%
Urinary Tract	90.1	6.8	3.1	0.12	1.13	748	14.1%
Total	92.9	4.0	3.1	0.05	0.80	5,307	100.0%

All Locations in Hospital, 2001-2004 Data, Czech Republic.
Breakpoints Based on Tentative CLSI Guidelines.

Table 7. Fluconazole MICs and Interpretation by Specimen Type for All Yeast

Specimen Type	% S	% SDD	% R	MIC 50	MIC 90	N	%
Biliary Tract	60.0	10.0	30.0	0.70	>165	10	0.2%
Blood	91.8	5.4	2.7	0.47	19.91	184	3.2%
CSF	100.0			3.04	3.04	1	0.0%
Genital	92.6	3.0	4.4	1.12	10.58	338	6.0%
Lower G.I.	81.0	6.0	13.0	1.64	>165	100	1.8%
Lower Resp. Tract	84.2	4.9	10.9	1.12	78.00	1,537	27.1%
Misc. / Other	89.9	4.0	6.0	1.12	28.73	397	7.0%
Misc. Fluids	86.5	7.7	5.8	1.12	42.11	52	0.9%
Skin / Soft Tissue	86.0	4.2	9.8	1.44	60.76	684	12.1%
Upper Resp. Tract	84.8	3.1	12.1	1.84	128.52	1,581	27.9%
Urinary Tract	78.0	8.3	13.6	3.04	128.52	779	13.8%
Total	84.8	4.7	10.5	1.44	78.00	5,663	100.0%

All Locations in Hospital, 2001-2004 Data, Czech Republic.
MIC Test Range <0.25 to >165 mcg/ml

Table 8. Voriconazole MICs and Interpretation by Location for All Yeast

Location	% S	% SDD	% R	MIC 50	MIC 90	N	%
Dermatology	98.0	2.0		0.05	0.41	200	3.8%
Hematology/Oncolo	92.2	3.9	3.9	0.05	0.94	1,178	22.2%
Medical	92.9	4.4	2.7	0.05	0.80	1,321	24.9%
Medical ICU	93.8	4.1	2.2	0.04	0.78	640	12.1%
Neo - Natal ICU	98.5	0.5	1.0	0.03	0.15	195	3.7%
ObGyn	96.4	2.8	0.8	0.04	0.22	247	4.7%
Other	100.0			0.08	0.85	21	0.4%
Surgical	89.9	5.1	5.1	0.05	1.16	493	9.3%
Surgical ICU	91.3	4.5	4.3	0.05	0.94	961	18.1%
Urology	96.1	3.9		0.05	0.76	51	1.0%
Total	92.9	4.0	3.1	0.05	0.80	5,307	100.0%

All Specimen Types, 2001-2004 Data, Czech Republic.
Breakpoints Based on Tentative CLSI Guidelines.

Table 9. Fluconazole MICs and Interpretation by Location for All Yeast

Location	% S	% SDD	% R	MIC 50	MIC 90	N	%
Dermatology	90.5	4.5	5.0	1.28	17.44	220	3.9%
Hematology/Oncolo	83.4	3.5	13.2	1.84	128.52	1,275	22.5%
Medical	86.2	5.1	8.6	1.44	47.34	1,380	24.4%
Medical ICU	84.8	6.5	8.7	1.12	47.34	664	11.7%
Neo - Natal ICU	97.5	1.5	1.0	1.12	5.71	203	3.6%
ObGyn	92.8	2.8	4.4	1.12	9.41	321	5.7%
Other	76.2		23.8	1.84	>165	21	0.4%
Surgical	81.5	5.5	13.1	1.84	128.52	513	9.1%
Surgical ICU	80.3	5.2	14.5	1.44	128.52	1,007	17.8%
Urology	83.1	8.5	8.5	1.44	60.76	59	1.0%
Total	84.8	4.7	10.5	1.44	78.00	5,663	100.0%

All Specimen Types, 2001-2004 Data, Czech Republic.
MIC Test Range <0.25 to >165 mcg/ml

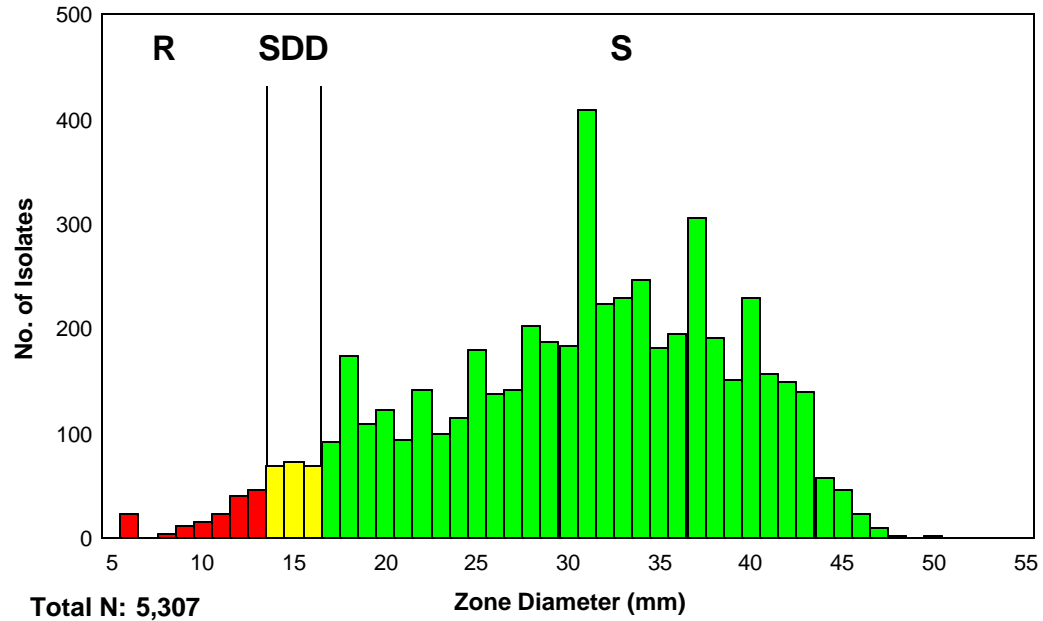


Figure 1. Voriconazole Zone Diameter Distribution with All Yeast - Czech Republic. 2001-2004 Data, All Specimen Types, All Locations in Hospital.

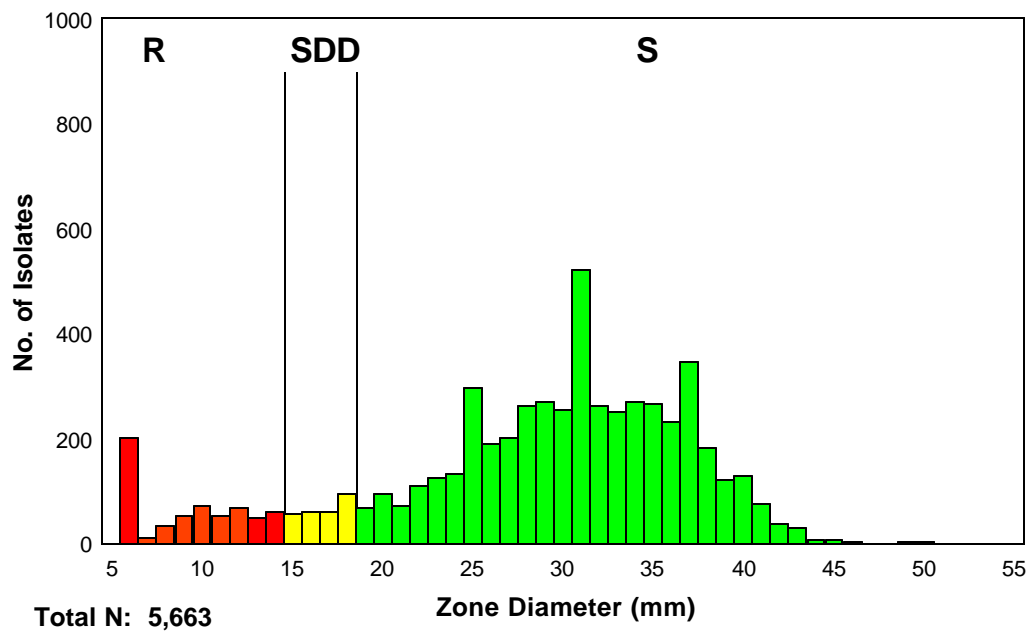


Figure 2. Fluconazole Zone Diameter Distribution with All Yeast - Czech Republic. 2001-2004 Data, All Specimen Types, All Locations in Hospital.

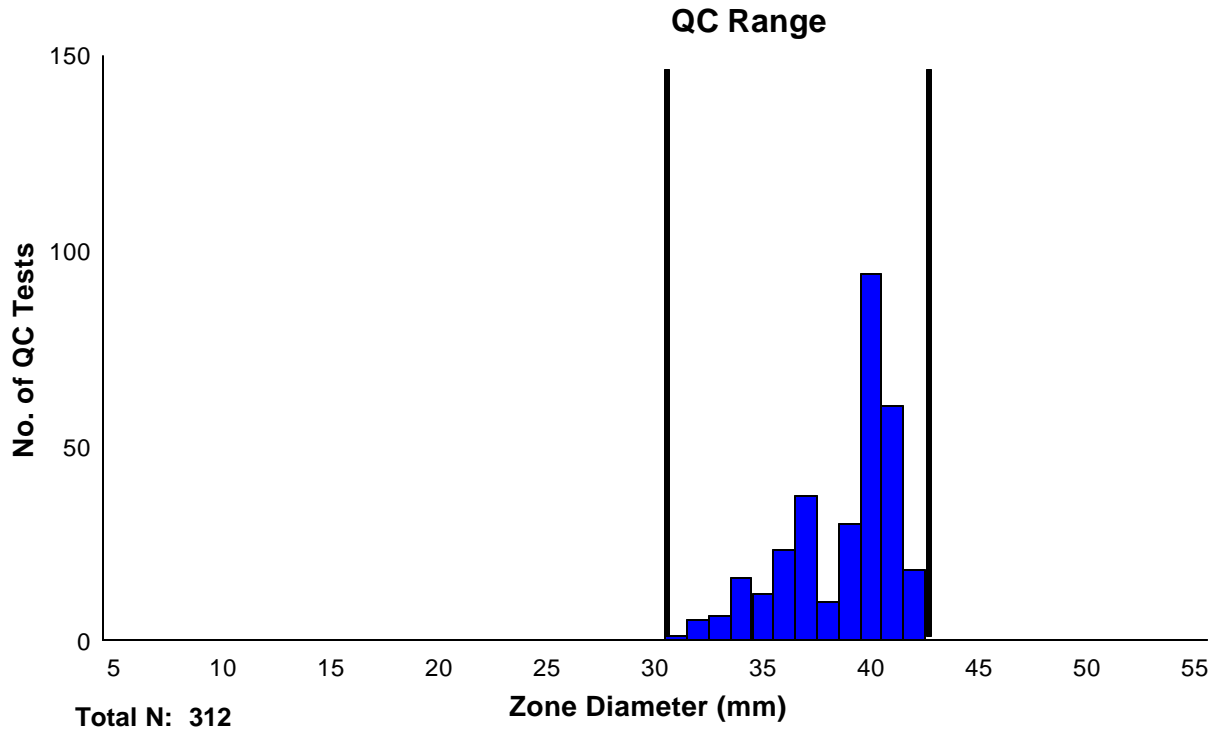


Figure 3. Voriconazole QC zone diameter distribution with ATCC 90028 *Candida albicans* Czech Republic, 2001-2004 Data.

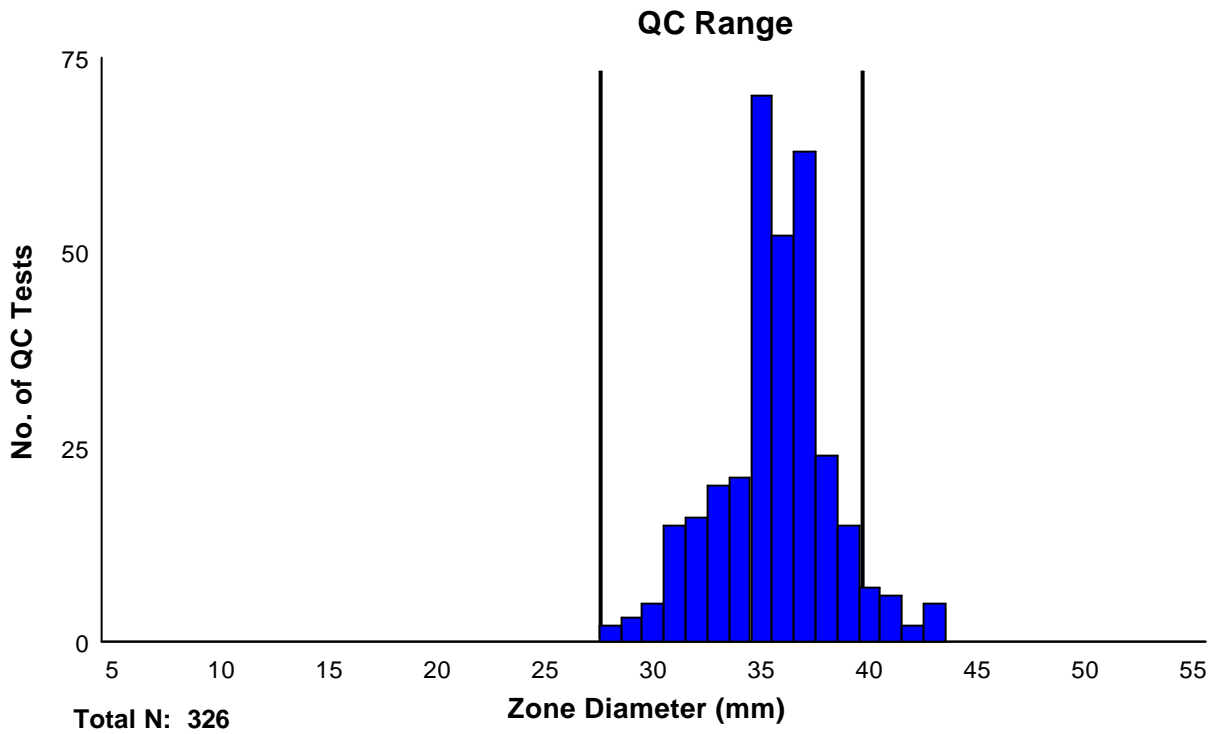


Figure 4. Fluconazole QC zone diameter distribution with ATCC 90028 *Candida albicans* Czech Republic, 2001-2004 Data.

Table 10. Four-Year Comparison of Voriconazole Resistance by Species

Organism	2001 Data		2002 Data		2003 Data		2004 Data	
	% R	N	% R	N	% R	N	% R	N
Candida albicans	0.3	720	0.0	801	0.1	881	0.0	752
Candida tropicalis	2.0	149	2.2	181	2.9	174	2.3	133
Candida glabrata	14.5	110	10.9	156	28.8	146	16.2	111
Candida krusei	9.6	73	14.0	107	17.6	125	6.3	80
Candida parapsilosis	0.0	57	0.0	59	0.0	63	0.0	47
Trichosporon sp.	0.0	39	4.9	41	8.3	24	0.0	7
Candida lusitanae	0.0	10	0.0	9	0.0	10	0.0	20
Candida famata	0.0	3	0.0	12	0.0	5	0.0	7
Candida kefyr	0.0	5	0.0	6	0.0	8	0.0	11
Saccharomyces cerevisiae	0.0	2	0.0	18	0.0	15	0.0	13
Candida inconspicua	0.0	7	0.0	11	0.0	14	0.0	16
Candida guilliermondii	0.0	7	0.0	5	0.0	3	0.0	9
Candida species					0.0	2	0.0	2
Trich. beigeli / cutaneum	0.0	5						
Trichosporon asahii							0.0	1
Trichosporon mucoides	0.0	1	0.0	2			0.0	9
Candida rugosa	0.0	1	0.0	3			0.0	2
Other Yeast	0.0	3						
Blastoschizomyces capitatus			0.0	2	33.3	3		
Candida lipolytica			50.0	2			0.0	2
Candida norvegensis							0.0	3
Candida zeylanoides							0.0	1
Cryptococcus neoformans							0.0	1
Total		1,192		1,415		1,473		1,227

All Specimen Types, All Locations in Hospital, Czech Republic.

N is total for that period/organism, Interpretation Based on Tentative CLSI Breakpoints.

Table 11. Seven Year Comparison of Fluconazole Resistance by Species for Czech Republic

Organism	1998 Data		1999 Data		2000 Data		2001 Data		2002 Data		2003 Data		2004 Data	
	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N
<i>Candida albicans</i>	1.0	308	0.5	836	0.5	983	0.2	938	0.1	814	0.3	881	0.0	752
<i>Candida tropicalis</i>	0.0	32	0.0	126	0.0	168	0.6	180	0.0	187	0.0	174	0.0	133
<i>Candida glabrata</i>	60.0	25	28.9	97	25.6	129	28.2	124	19.5	159	35.6	146	28.8	111
<i>Candida krusei</i>	100.0	10	73.9	69	75.9	79	82.4	91	92.0	112	98.4	125	92.5	80
<i>Candida parapsilosis</i>	0.0	40	0.0	91	1.1	88	0.0	74	0.0	59	0.0	63	0.0	47
<i>Trichosporon</i> sp.	0.0	13	0.0	45	7.0	43	5.9	51	38.1	42	29.2	24	14.3	7
<i>Candida lusitanae</i>			0.0	22	0.0	20	0.0	13	0.0	10	0.0	10	5.0	20
<i>Candida famata</i>	33.3	9	4.5	22	0.0	14	20.0	5	41.7	12	20.0	5	0.0	7
<i>Candida kefyr</i>	0.0	5	0.0	17	0.0	19	0.0	7	0.0	6	0.0	8	0.0	11
<i>Saccharomyces cerevisiae</i>					18.2	11	0.0	6	5.6	18	6.7	15	15.4	13
<i>Candida inconspicua</i>					20.0	5	57.1	7	41.7	12	21.4	14	37.5	16
<i>Saccharomyces</i> sp.	0.0	2	3.4	29	11.1	9	0.0	3	0.0	1				
<i>Candida guilliermondii</i>					0.0	5	0.0	7	20.0	5	33.3	3	11.1	9
<i>Candida</i> species	0.0	1	0.0	3	0.0	7					0.0	2	0.0	2
<i>Trich. beigeli</i> / <i>cutaneum</i>					77.8	9	40.0	5						
<i>Trichosporon asahii</i>					0.0	13							0.0	1
<i>Trichosporon mucoides</i>							0.0	1	0.0	2			0.0	9
<i>Candida rugosa</i>					0.0	2	0.0	1	0.0	3			0.0	2
Other Yeast			0.0	1	0.0	1	0.0	4						
<i>Blastoschizomyces capitatus</i>									0.0	2	33.3	3		
<i>Candida lipolytica</i>									0.0	2			0.0	2
<i>Rhodotorula</i> sp.	100.0	2	100.0	1	100.0	1								
<i>Candida norvegensis</i>													0.0	3
<i>Candida zeylanoides</i>													0.0	1
<i>Cryptococcus laurentii</i>					0.0	1								
<i>Cryptococcus neoformans</i>													0.0	1
Total		447		1,359		1,607		1,517		1,446		1,473		1,227

All Specimen Types, All Locations in Hospital.

N is total count for that period/organism.

Table 12. Seven Year Comparison of Isolation Rates by Species for Czech Republic

Organism	1998 Data		1999 Data		2000 Data		2001 Data		2002 Data		2003 Data		2004 Data	
	% of Total	N	% of Total	N	% of Total	N	% of Total	N	% of Total	N	% of Total	N	% of Total	N
<i>Candida albicans</i>	68.90	308	61.52	836	61.17	983	61.83	938	56.29	814	59.81	881	61.29	752
<i>Candida tropicalis</i>	7.16	32	9.27	126	10.45	168	11.87	180	12.93	187	11.81	174	10.84	133
<i>Candida glabrata</i>	5.59	25	7.14	97	8.03	129	8.17	124	11.00	159	9.91	146	9.05	111
<i>Candida krusei</i>	2.24	10	5.08	69	4.92	79	6.00	91	7.75	112	8.49	125	6.52	80
<i>Candida parapsilosis</i>	8.95	40	6.70	91	5.48	88	4.88	74	4.08	59	4.28	63	3.83	47
<i>Trichosporon</i> sp.	2.91	13	3.31	45	2.68	43	3.36	51	2.90	42	1.63	24	0.57	7
<i>Candida lusitanae</i>			1.62	22	1.24	20	0.86	13	0.69	10	0.68	10	1.63	20
<i>Candida famata</i>	2.01	9	1.62	22	0.87	14	0.33	5	0.83	12	0.34	5	0.57	7
<i>Candida kefyr</i>	1.12	5	1.25	17	1.18	19	0.46	7	0.41	6	0.54	8	0.90	11
<i>Saccharomyces cerevisiae</i>					0.68	11	0.40	6	1.24	18	1.02	15	1.06	13
<i>Candida inconspicua</i>					0.31	5	0.46	7	0.83	12	0.95	14	1.30	16
<i>Saccharomyces</i> sp.	0.45	2	2.13	29	0.56	9	0.20	3	0.07	1				
<i>Candida guilliermondii</i>					0.31	5	0.46	7	0.35	5	0.20	3	0.73	9
<i>Candida</i> species	0.22	1	0.22	3	0.44	7					0.14	2	0.16	2
<i>Trich. beigeli</i> / <i>cutaneum</i>					0.56	9	0.33	5						
<i>Trichosporon asahii</i>					0.81	13							0.08	1
<i>Trichosporon mucoides</i>							0.07	1	0.14	2			0.73	9
<i>Candida rugosa</i>					0.12	2	0.07	1	0.21	3			0.16	2
Other Yeast			0.07	1	0.06	1	0.26	4						
<i>Blastoschizomyces capitatus</i>									0.14	2	0.20	3		
<i>Candida lipolytica</i>									0.14	2			0.16	2
<i>Rhodotorula</i> sp.	0.45	2	0.07	1	0.06	1								
<i>Candida norvegensis</i>													0.24	3
<i>Candida zeylanoides</i>													0.08	1
<i>Cryptococcus laurentii</i>					0.06	1								
<i>Cryptococcus neoformans</i>													0.08	1
Total		447		1,359		1,607		1,517		1,446		1,473		1,227

All Specimen Types, All Locations in Hospital.

N is total for that period/organism.

Appendix I: List of Contributing Sites

Country	Institution	Investigator	City	Reporting
Argentina	Buenos Aires University	Dr. Jorge Finquelievich	Buenos Aires	1998-2004
Argentina	Hospital Escuela Gral.	Dr. Nora Tiraboschi	Buenos Aires	2001-2004
Argentina	Hospital Durand	Dr. Jorge Finquelievich (inactive)	Buenos Aires	1997-1999
Australia	Women's and Children's Hospital	Dr. David Ellis	N. Adelaide	1998-2004
Australia	Westmead Hospital	Dr. Sharon Chen (inactive)	Westmead	1998
Belgium	CHU de Jumet	Dr. Dominique Frameree	Jumet	1999-2004
Belgium	St Lucas Campus Heilige Familie	Dr. Annemarie van den Abeele	Gent	1998-2004
Belgium	Hôpital de la Citadelle	Dr. Jean-Marc Senterre (inactive)	Liege	1998-2003
Brazil	Escola Paulista de Medicina	Dr. Arnaldo Colombo	Sao Paulo	1999-2004
Brazil	Fleury/LIM 54, HC-FMUSP	Dr. Caio Mendes (inactive)	Sao Paulo	1998
Canada	University of Alberta Hospital	Dr. Robert Rennie	Edmonton	2001-2004
Canada	Royal University Hospital	Dr. Steve Sanche	Saskatoon	2001-2004
China	Zhong Shan Hospital	Prof. Hu Bijie	Shanghai	1998-2004
China	Peking Union Medical College Hosp.	Prof. Yingchun Xu	Beijing	1999-2004
China	Hua Shan Hospital	Yingyuan Zhang	Shanghai	2003-2004
China	Guangzhou Inst of Respiratory Dis	Nan Shan Zhong	Guangzhou	2003-2004
China	Zhejiang Hospital	Yu Yun-Song	Hang Zhou	2003-2004
Colombia	Inst. Nacional de Cancerología	Dr. Pilar Rivas	Bogota	2002-2004
Colombia	CIB	Angela Restrepo, Catalina Bedout	Medellin	1999-2004
Colombia	Hospital Militar Central	Ricardo Vega, Matilde Mendez	Bogota	2000-2004
Czech Rep.	Hospital Ceske Budejovice	Dr. Nada Mallatova	Ceske	1998-2004
Czech Rep.	Health Institute Ostrava	Dr. Stanislava Dobiasova	Ostrava	1999-2004
Ecuador	Hospital FF. AA - HG1	Dr. Julio Ayabaca	Quito	1999-2004
Ecuador	Hospital Vozandes	Dr. Jeannete Zurita	Quito	2002-2004
France	Faculte de Pharmacie	Prof. M. Mallie	Montpellier	1998-2004
France	Institut de Parasitologie	Pr. E. Candolfi	Strasbourg	2000-2004
France	Institut Pasteur	Prof Bertrand Dupont (inactive)	Paris	2000-2001
France	Hopital de Rangueil	Prof J.P. Sequela (inactive)	Toulouse	2001
Germany	Universitaet Muenster	PD Dr. W. Fegeler (inactive)	Münster	2002-2003
Germany	Ludwig Maximilian University	Mrs. Dr. Haas (inactive)	Munich	2002
Germany	Klinikum der J. W. Goethe Univ.	Prof. Pramod M. Shah (inactive)	Frankfurt	2002
Germany	Technische Universitat Munchen	Prof. Dr. I. Braveny (inactive)	München	1997-2002
Germany	Ernst-Moritz-Arndt-Universitat	Dr. Hannelore Bernhardt (inactive)	Greifswald	1997
Germany	RWTH Aachen	PD Dr. Haase (inactive)	Aachen	2001-2003
Germany	Inst. F. Med. Mikrobiologie	Prof Dr. Rodloff (inactive)	Leipzig	2001-2003
Germany	Carl-Thiem Klinikum	PD Dr. W. Bar (inactive)	Cottbus	2001-2003
Germany	Charite	Dr. U. Gobel (inactive)	Berlin	2001
Germany	Humaine Kliniken	Dr. V. Czaika (inactive)	Bad Saarow	2003
Greece	Laikon General Hospital	Prof. George Petrikos	Athens	1998-2004
Hungary	BAZ County Institute	Dr. Erzsébet Puskás MD	Miskolc	1999-2004
Hungary	Johan Bela Institute	Dr. M. Konkoly-Thege (inactive)	Budapest	1999-2001
Hungary	Bajcsy Zsilinszky Hospital	Dr. István Barcs MD (inactive)	Budapest	1999-2001
Hungary	Szent-Györgyi Albert Medical Univ.	Dr. Erzsébet Nagy MD	Szeged	1999-2004
Hungary	Medical Univ. of Pecs	Dr. Mestyan Gyula	Pecs	2000-2004
Hungary	Szt Laszlo Hospital	Dr. Radka Nikolova	Budapest	2003-2004
India	All India Inst. of Medical Sciences	Dr. Uma Banerjee	New Delhi	2003-2004
Israel	Sheba Medical Center	Dr. Nathan Keller	Tel-Hashomer	2003-2004
Italy	Università degli Studi di Torino	Dr. Vivian Tullio	Torino	2000-2004
Italy	University of Genoa	Prof. Gian Carlo Schito	Genoa	2000-2004
Italy	Ospedale di Novara	Dr. Giacomo Fortina (inactive)	Novara	2000-2003
Italy	Univerrsità di Roma Tor Vergata	Dr. Gian Piero Testore (inactive)	Rome	2000-2003
Italy	Pescara Civil Hospital	Dr. Domenico D'Antonio	Pescara	2001-2004
Italy	Istituto di Malattie Infettive	Dr. Giorgio Scalise (inactive)	Ancona	2001-2003
Italy	Dept di Biotechnologie	Dr. Pietro Martino	Rome	2001-2004
Italy	Università di Genova	Dr. Graziana Manno	Genova	2003-2004
Japan	Juntendo University	Dr. Jun Igari (inactive)	Tokyo	1998
Malaysia	University Malaya	Dr. NG Kee Peng	Kuala Lumpur	1997-2004

Appendix I: List of Contributing Sites (Continued)

Country	Institution	Investigator	City	Reporting
Mexico	Hospital General de Mexico	Dr. Celia Alpuche, Dr Jose Santos	Mexico City	1999-2004
Mexico	Universidad de Guadalajara	Dr. Eduardo Rodriguez Noriega	Guadalajara	2002-2004
Mexico	Hospital General O'Horan	Dra. Mussaret Zaidi	Merida	1998-2004
Netherlands	Canisius Wilhemina Hospital	Dr. Jacques F.G.M. Meis	Nijmegen	2003-2004
Netherlands	University Hospital Radboud	Dr. Jacques Meis (inactive)	Nijmegen	1997-2001
Norway	Rikshospitalet	Dr. Egil Lingaas (inactive)	Oslo	1998-2003
Peru	National Institute of Health of Peru	Dr. Susana Zurita (inactive)	Lima	1999
Poland	Children's Memorial Health Institute	Danuta Dzierzanowska	Warsaw	1997-2004
Poland	Pracownia Bakteriologii	Waclaw Pawliszyn	Krakow	2002-2004
Portugal	Inst. de Higiene e Medicina Tropical	Dra. Mariada Luz Martins	Lisboa	1998-2004
Portugal	Centro Hospitalar de Coimbra	Dr. Luis Albuquerque	Coimbra	2002-2004
Portugal	Instituto Nacional de Saude	Dr. Laura Rosado	Lisboa	2003-2004
Portugal	Hosp da Universidade de Coimbra	Dr. Rosa Velho	Coimbra	2003-2004
Portugal	Hospital de Santo Antonio	Dr. Jose Amorim	Porto	2003-2004
Portugal	Hospital de Sao Joao	J. H. C. da Fonsesca (inactive)	Porto	2002
Russia	Smolensk Medical Academy	Prof. Leonid Stratchounski (inactive)	Smolensk	1998-2002
Russia	Novosibirsk Regional Hospital	Vera N. Ilina	Novosibirsk	2003-2004
Russia	Antimicrobial Chemo Res Inst	Olga I Kretchikova	Smolensk	2003-2004
Russia	Russian Academy of Med Sciences	Galina A. Klyasova	Moscow	2003-2004
Russia	City Clinical Hosp No 40	Sophia M. Rozanova	Ekaterinburg	2003-2004
Russia	Territory Center of Lab Diagnostics	Irina G. Mulykh	Krasnodar	2003-2004
Russia	Medical Mycology Research Inst.	Nikolay N. Klimko	St. Petersburg	2003-2004
Russia	Irkutsk Regional Childrens Hospital	Elena D. Agapova	Irkutsk	2003-2004
Russia	Oncology Research Center	Natalya V. Dmitrieva	Moscow	2003-2004
Saudi Arabia	Riyadh Armed Forces Hospital	Dr. Abdul Mohsen Al-Rasheed	Riyadh	2003-2004
Saudi Arabia	King Khalid Hospital	Prof. Atef M. Shibl	Riyadh	2004
Singapore	Singapore General Hospital	Dr. Lynette Oon (inactive)	Singapore	1998-1999
Slovak Rep.	National Cancer Center	Prof. Jan Trupl	Bratislava	1998-2004
Slovak Rep.	NUTARCH	Prof. Leon Langsadi MD	Bratislava	2001-2004
Slovak Rep.	Derer University Hospital	Alena Vaculikova M.D. (inactive)	Bratislava	2001-2003
Slovak Rep.	St. Cyril and Metod Hospital	Hupkova Helena MD Ph.D.	Bratislava	2001-2004
S. Africa	Groote Schuur Hospital	Dr. Denise Roditi (inactive)	Cape Town	1998-2003
S. Africa	King Edward Hospital	Dr. Das Pillay (inactive)	Durban	1998-2000
S. Africa	Ga-Rankuwa Hospital	Prof. Anwar Hoosen	Medunsa	1998-2004
S. Africa	Baragwanath Hospital	Prof. H.H. Crewe-Brown	Johannesburg	1998-2004
S. Africa	Pelanomi Hospital, UOFS	Dr. M. N. Janse van Rensburg	Bloemfontein	1998-2004
S. Africa	Johannesburg General Hospital	Dr. Adriano Duse	Johannesburg	1998-2004
S. Korea	Yonsei Univ. College of Medicine	Dr. Kyungwon Lee	Seoul	1997-2004
S. Korea	Asan Medical Center	Prof. Mi-Na Kim	Seoul	2003-2004
Spain	Hospital 12 De Octubre	Dr. A. del Palacio	Madrid	1997-2004
Spain	Hospital Ramon y Cajal	Dr. Fernando Baquero	Madrid	1997-2004
Sweden	Sahlgrenska Hospital	c/o Pfizer Sweden (inactive)	Goteborg	1997-1999
Switzerland	Institute of Microbiology CHUV	Prof. Jacques Bille	Lausanne	1997-2004
Switzerland	Universitat Bern	Dr. K. Muhlethaler	Bern	2001-2004
Taiwan	National Taiwan University Hospital	Dr. Shan-Chwen Chang	Taipei	1998-2003
Taiwan	China Medical College Hospital	Jen-Hsien Wang	Taichung	2001-2004
Taiwan	VGH-TPE	Kwok-Woon Yu (inactive)	Taipei	2001
Thailand	Ramathibodi Hospital, Mahidol Univ.	Dr. Malai Vorachit	Bangkok	1999-2004
Thailand	Chiang-Mai University Hospital	Dr. Prasit Tharavichitkul (inactive)	Chaing-Mai	1998-2001
Turkey	Hacettepe Univ. - Children's Hospital	Dr. Deniz Gur	Ankara	1997-2004
Turkey	Marmara Medical School Hospital	Prof. Volkan Korten	Istanbul	2001-2004
UK	Royal Sussex County Hospital	Dr. John Paul	Brighton	2002-2004
UK	Glasgow Royal Infirmary	Dr Brian Jones (inactive)	Glasgow	2002-2003
UK	Freeman Hospital	Dr. F. Kate Gould	Newcastle	2002-2004
UK	Addenbrooke's Hospital	Dr. Derek Brown	Cambridge	2004
UK	Royal Free Hospital	Dr. Chris Kibbler	London	2002-2004
UK	Imperial College School of Medicine	Dr. Michael Petrou (inactive)	London	1998-1999
UK	Friarage Hospital	Dr. Nigel Weightman	Northallerton	1998-2004

Appendix I: List of Contributing Sites (Continued)

Country	Institution	Investigator	City	Reporting
UK	Aberdeen Royal Hospital	Dr. Ian M. Gould	Aberdeen	1997-2004
UK	General Infirmary, P.H.L.S	Dr. Ruth Ashbee	Leeds	1998-2004
UK	Cardiff University	Dr Rosemarie Barnes	Cardiff	2003-2004
USA	Harper Hospital, Wayne State Univ.	Jose Vazquez	Detroit	2001-2004
USA	Mt. Sinai Medical Center	Dr. Ed Chan (inactive)	New York	2001-2003
USA	Cornell Medical Center NYPH	Dr. Davise Larone	New York	2001-2004
USA	NYS Department of Health	Vishnu Chaturvedi (inactive)	Albany	2001-2002
USA	Stanford Hospital and Clinics	Ellen Jo Baron, Ph.D. (inactive)	Stanford	2001-2003
USA	UCLA Medical Center	Ms. Janet Hindler (inactive)	Los Angeles	2001
USA	University Hospitals of Cleveland	Dr. Mahmoud A. Ghannoum (inactive)	Cleveland	2001-2003
USA	Univ. of Texas Health Science Center	Dr. Mike Rinaldi	San Antonio	2001-2004
USA	University of Virginia Health Systems	Dr. Kevin Hazen	Charlottesville	2001-2004
USA	Christiana Care	Elyse Foraker	Wilmington	2003-2004
Venezuela	Gen del Este Dr Domingo Luciani	Dr. Heidi Reyes	Caracas	2002-2004
Venezuela	Universitario de Caracas	Dr. Axel Santiago	Caracas	1997-2004

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