## Population-Based Analysis of Invasive Fungal Infections, France, 2001–2010

### Technical Appendix 2: Distribution of and Trends in invasive fungal infections by demographics, risk groups, and risk factors; France, 2001-2010

#### Table 1. Incidence and fatality rate of invasive fungal infections averaged by invasive fungal type, age group, and gender, metropolitan France, 2001–2010*

| Age, days/years | Candidemia | Invasive aspergillosis | Mucomycosis | Pneumocystis pneumonia | Cryptococcosis |
|-----------------|------------|------------------------|-------------|------------------------|---------------|
|                 | Incidence | Fatality Rate (FR) | Incidence | Fatality Rate (FR) | Incidence |
| 0–29 d          | 2.2       | 0.25 (61.5)           | 0.1        | 0.57 (67.1)           | 0.03 (50.0)   |
| 30 d–9 y        | 0.5       | 0.15 (59.2)           | 0.3        | 0.20 (56.7)           | 0.02 (57.1)   |
| 10–19 y         | 0.3       | 0.18 (57.5)           | 0.5        | 0.20 (64.7)           | 0.03 (57.1)   |
| 20–29 y         | 0.6       | 0.21 (51.8)           | 0.6        | 0.18 (54.2)           | 0.05 (64.1)   |
| 30–39 y         | 1.0       | 0.21 (56.2)           | 0.8        | 0.22 (57.4)           | 0.05 (62.5)   |
| 40–49 y         | 1.7       | 0.22 (56.2)           | 1.3        | 0.25 (63.9)           | 0.08 (58.8)   |
| 50–59 y         | 3.4       | 0.26 (66.1)           | 2.4        | 0.26 (66.1)           | 0.13 (61.5)   |
| 60–69 y         | 5.8       | 0.31 (66.9)           | 3.6        | 0.31 (66.9)           | 0.18 (64.0)   |
| 70–79 y         | 8.1       | 0.37 (65.2)           | 3.1        | 0.37 (65.2)           | 0.16 (56.6)   |
| 80–89 y         | 8.6       | 0.34 (58.3)           | 1.8        | 0.34 (58.3)           | 0.23 (38.2)   |
| ≥90 y           | 5.3       | 0.42 (46.2)           | 0.6        | 0.42 (46.2)           | 0.24 (27.3)   |
| **Average**     | 2.5       | 0.29 (68.8)           | 1.4        | 0.29 (68.8)           | 0.08 (57.7)   |

*Incid, incidence; FR, fatality rate; NA, not applicable to this age group.
Technical Appendix 2, Table 2. Invasive fungal infections in metropolitan France, 2004–2010: distribution of risk factors by type of IFI and evolution of incidence (trend) in the population

| Risk factors                              | Candidemia | Invasive aspergillosis | Mucormycosis | Pneumocystis pneumonia | Cryptococcosis |
|-------------------------------------------|------------|------------------------|--------------|------------------------|---------------|
| Hematologic malignancy                   | 1,710      | + 5.8 <0.001           | 3,496        | + 4.2 <0.001           | 143 + 10.3 0.02 |
| with H SCT                                | 276        | + 6.4 0.04             | 890          | + 10.3 <0.001          | 40 NA NA NA   |
| with neutropenia                          | 721        | + 7.0 <0.001           | 1,540        | + 8.0 <0.001           | 53 + 20.7 <0.001 |
| with none of above HIV/AIDS               | 713        | + 4.4 0.02             | 1,066        | - 5.4 <0.001           | 50 NA NA NA   |
| Solid organ transplant                    | 190        | + 7.3 0.05             | 231          | + 12.5 <0.001          | 9 NA NA NA    |
| Solid tumor                              | 3,683      | + 14.6 <0.001          | 473          | + 4.7 0.049            | 19 NA NA NA   |
| Systemic inflammatory diseases            | 178        | + 8.3 0.04             | 140          | NA NA NA               | 9 NA NA NA    |
| Diabetes                                 | 1,123      | + 8.3 <0.001           | 207          | NA NA NA               | 68 NA NA NA   |
| Chronic respiratory diseases              | 433        | + 4.7 0.06             | 529          | NA NA NA               | 13 NA NA NA   |
| Chronic renal failure                     | 336        | + 10.3 <0.001          | 68           | + 21.0 0.003           | 8 NA NA NA    |
| Other diseases†                          | 1,751      | + 6.4 <0.001           | 189          | + 10.7 0.006           | 19 NA NA NA   |
| Unspecified                               | 2,493      | + 6.3 <0.001           | 1,006        | + ns                   | 108 NA NA NA  |
| Total                                    | 12,039     | + 9.2 <0.001           | 6,433        | + 4.0 <0.001           | 411 + 7.6 0.003 |

*Evol.: evolution of incidence over the period (increase +, decrease -); NA, not applicable; no substantial evolution over the period; P = p value of trend; %: annual percentage of increase or decrease of incidence in the general population.
†Other diseases: the 1,751 patients with candidemia accounted for 15.8% of cirrhosis, <6% of morbid obesity and pancreatitis, and 84.6% acute renal failure (not exclusive). The 189 invasive aspergillosis case-patients accounted for 24.3% of cirrhosis and 87.8% acute renal failure. The 19 mucormycosis case-patients included 10.5% of cirrhosis and 63.2% acute renal failure.
‡Unspecified: The 2,493 patients with candidemia required a stay in an intensive care unit (ICU) (841 cases; 6.9% of the total), surgical procedures (317 cases; 2.6%), extreme age with no other known factor (484 cases; 4.0%), and 851 cases (7.1%) with no specific risk factor. The 108 mucormycosis case-patients required a stay in ICU or surgical ward (20 cases; 4.0%), extreme age (27 cases; 6.6%) and 61 cases (14.8%) with no specific risk factor. Data for the 299 patients with Pneumocystis jiroveci pneumonia required a stay in ICU or surgical procedures (56 cases; <1% of the total), extreme age with no other risk factor (<1%) and 226 cases (3.8%) with no specific risk factor. The 161 cryptococcosis cases required a stay in ICU or surgical ward (46 cases; 4.1%), extreme age (27 cases; 2.4%) and 95 cases (8.5%) with no specific risk factor.
### Technical Appendix 2, Table 3. Age- and sex–adjusted odds ratio (OR) of death by invasive fungal infections and by significant (p<0.05) risk factor, metropolitan France, 2004–2010

| Patient characteristics | Candidemia | Invasive Aspergillosis | Mucormycosis | Pneumocystis pneumonia, HIV/AIDS(-) | Cryptococcosis, HIV/AIDS(-) | Pneumocystis pneumonia, HIV/AIDS(+) | Cryptococcosis, HIV/AIDS(+) |
|-------------------------|------------|------------------------|--------------|----------------------------------|-----------------------------|---------------------------------|-----------------------------|
| **Age, y**               |            |                        |              |                                  |                             |                                 |                             |
| <10                     | 1          | 1.00-1.00              | 1            | 1.00-1.00                        | NA                          | NA                              | NA                          |
| 10–19                   | 1.05       | 1.04-1.05              | 0.75         | 0.64-0.86                       | 1.19                        | 0.99-1.39                       | 1.01                        |
| 20–29                   | 1.16       | 1.14-1.18              | 0.69         | 0.55-0.83                       | 1.43                        | 0.95-1.90                       | 1.07                        |
| 30–39                   | 1.35       | 1.31-1.39              | 0.69         | 0.54-0.85                       | 1.70                        | 0.85-2.56                       | 1.22                        |
| 40–49                   | 1.64       | 1.56-1.71              | 0.75         | 0.57-0.93                       | 2.03                        | 0.67-3.40                       | 1.52                        |
| 50–59                   | 2.07       | 1.93-2.22              | 0.87         | 0.66-1.09                       | 2.43                        | 0.39-4.47                       | 2.14                        |
| 60–69                   | 2.74       | 2.48-3.00              | 1.11         | 0.83-1.39                       | 2.90                        | -0.02-5.82                      | 3.50                        |
| 70–79                   | 3.78       | 3.30-4.25              | 1.56         | 1.15-1.98                       | 3.46                        | -0.60-7.53                      | 6.86                        |
| 80–89                   | 5.43       | 4.56-6.29              | 2.47         | 1.72-3.21                       | 4.14                        | -1.41-9.69                      | 16.50                       |
| ≥90                     | 8.11       | 6.51-9.71              | 4.42         | 2.78-6.06                       | 4.94                        | -2.52-12.40                     | NA                          |
| **Sex, F**              |            |                        |              |                                  |                             |                                 |                             |
| NS                      |            |                        |              |                                  |                             |                                 |                             |
| **HM+HSCT**             | 1.33       | 1.00 - 1.76            | 1.81         | 1.46 - 2.24                     | 5.97                        | 2.42 - 14.72                    | NS                          |
| **HM+neutropenia**      | 1.58       | 1.33 - 1.87            | 1.36         | 1.14 - 1.62                     | 5.86                        | 2.64 - 13.01                    | NS                          |
| **HM**                  | 1.40       | 1.18 - 1.67            | 2.03         | 1.69 - 2.44                     | 3.60                        | 1.54 - 8.39                     | 0.70                        |
| **HIV/AIDS**            |            |                        |              |                                  |                             |                                 |                             |
| **Solid org.transplant**|            |                        |              |                                  |                             |                                 |                             |
| **Solid Tumors**        | 1.87       | 1.71 - 2.04            | 2.13         | 1.75 - 2.60                     | NS                          | 2.26                          | 1.61 - 3.17                  |
| **Diabetes**            | 0.79       | 0.71 - 0.89            | NS           | 0.65                          | 0.43 - 0.99                 | NS                              | NS                          |
| **Respiratory diseases**|            |                        |              |                                  |                             |                                 |                             |
| **Chronic renal failure**|            |                        |              |                                  |                             |                                 |                             |
| **Cirrhosis**           | 2.48       | 2.04 - 2.99            | 1.58         | 1.05 - 2.39                     | NS                          | 2.84                          | 1.21 - 6.67                  |
| **Acute renal failure** | 1.84       | 1.56 - 2.16            | 2.32         | 1.82 - 2.97                     | NS                          | 2.82                          | 2.01 - 3.95                  |
| **Surgery**             | 0.60       | 0.54 - 0.66            | NS           |                                | NS                          |                                | NS                          |
| **Intensive care**      |            |                        |              |                                  |                             |                                 |                             |

HM, hematologic malignancy; HSCT, hematologic stem cell transplantation; NA, not applicable; no occurrences of infection in this risk group; NS, not statistically significant.