

1 **SUPPLEMENTARY MATERIAL**

2 **For *Aspergillus fumigatus***

3 The final PubMed search was: **Aspergillus fumigatus**[MeSH Terms) combined, using AND
4 term, with criteria terms including (mortality[MeSH Terms]) OR (morbidity[MeSH Terms])
5 OR (hospitalisation[MeSH Terms]) OR (disability[All Fields]) OR (drug resistance,
6 fungal[MeSH Terms]) OR (prevention and control[MeSH Subheading]) OR (disease
7 transmission, infectious[MeSH Terms]) OR (diagnostic[Title/Abstract]) OR (antifungal
8 agents[MeSH Terms]) OR (epidemiology[MeSH Terms]) OR (surveillance [Title/Abstract]).

9

10 The final Web of Science search was: [TI=("aspergillus fumigatus") OR TI=("a.fumigatus")],
11 combined, using AND term, with criteria terms each as topic search, including (mortality) OR
12 (case fatality) OR (morbidity) OR (hospitali*ation) OR (disability) OR (drug resistance) OR
13 (prevention and control) OR (disease transmission) OR (diagnostic) OR (antifungal agents) OR
14 (epidemiology) OR (surveillance). Symbol * allows a truncation search for variations of the
15 term (e.g. hospitalisation or hospitalization).

16 All searches were limited to 1 Jan 2016 to 10 June 2021.

17 **Table S1. Risk of Bias Assessment by Domain.**

Author	Year	Overall risk	Domains assessed					
			Selection of participants	Confounding variables	Measurement of exposure	Blinding of outcome assessments	Incomplete outcome data	Selective outcome reporting
Abdolrasouli <i>et al.</i> ⁽³⁴⁾	2018	Unclear	Low	Unclear	Unclear	NA	Unclear	NA
Abdolrasouli <i>et al.</i> ⁽³⁵⁾	2018	Low	Low	Low	Low	NA	NA	NA
Alastruey-Izquierdo <i>et al.</i> ⁽³⁶⁾	2018	Low	Low	Low	Low	NA	Low	NA
Ashu <i>et al.</i> ⁽³⁸⁾	2018	Unclear	Unclear	Unclear	Low	NA	NA	NA
Borman <i>et al.</i> ⁽³⁹⁾	2020	Low	Low	Low	Low	NA	Low	NA
Buil <i>et al.</i> ⁽⁴⁰⁾	2018	Low	Low	Low	Low	NA	NA	NA
Bustamante <i>et al.</i> ⁽⁴¹⁾	2020	Unclear	Unclear	Unclear	Unclear	NA	NA	NA
Castanheira <i>et al.</i> ⁽⁴²⁾	2017	Low	Low	Low	Low	NA	NA	NA
Chen <i>et al.</i> ⁽⁴³⁾	2016	Unclear	Low	Unclear	Low	NA	NA	NA
Cho <i>et al.</i> ⁽²⁹⁾	2019	Unclear	Low	Unclear	Low	NA	NA	NA
Dabas <i>et al.</i> ⁽²⁵⁾	2018	Unclear	Unclear	Unclear	Low	NA	NA	NA
Deng <i>et al.</i> ⁽⁴⁴⁾	2017	Unclear	Unclear	Unclear	Low	NA	NA	NA
Dib <i>et al.</i> ⁽⁶⁷⁾	2020	Low	Low	Low	Low	NA	Low	NA
Espinel-Ingroff <i>et al.</i> ⁽⁴⁹⁾	2018	High	High	Unclear	NA	NA	NA	NA
Forsythe <i>et al.</i> ⁽³³⁾	2020	High	Unclear	High	Unclear	NA	Unclear	Unclear
Fukuda <i>et al.</i> ⁽¹¹⁰⁾	2018	Unclear	Low	Low	Unclear	NA	NA	NA
Guegan <i>et al.</i> ⁽¹¹¹⁾	2021	Unclear	Unclear	Unclear	Low	NA	NA	NA
Heo <i>et al.</i> ⁽²⁷⁾	2017	Low	Low	Low	Low	NA	Low	NA
Jensen <i>et al.</i> ⁽³⁷⁾	2016	Unclear	Unclear	Unclear	NA	NA	NA	NA
Koehler <i>et al.</i> ⁽⁵⁰⁾	2017	Unclear	Low	Unclear	Unclear	NA	Unclear	Low
Lane <i>et al.</i> ⁽³²⁾	2018	High	Unclear	High	High	NA	NA	NA

Lavergne <i>et al.</i> ⁽⁵²⁾	2019	Low	Low	Low	Low	NA	NA	NA
Lee <i>et al.</i> ⁽¹¹²⁾	2020	Low	Low	Low	Low	NA	Low	NA
Lestrade <i>et al.</i> ⁽⁶⁸⁾	2016	High	Unclear	High	Low	NA	NA	NA
Lestrade <i>et al.</i> ⁽³⁰⁾	2018	Low	Low	Low	Low	NA	Low	NA
Lestrade <i>et al.</i> ⁽²⁸⁾	2019	Low	Low	Low	Low	NA	Low	NA
Lestrade <i>et al.</i> ⁽⁵³⁾	2020	Unclear	Unclear	Unclear	Unclear	NA	NA	NA
Messer <i>et al.</i> ⁽⁵⁵⁾	2020	Unclear	Low	Unclear	Low	NA	NA	NA
Mohammadi <i>et al.</i> ⁽⁵⁶⁾	2018	Unclear	Unclear	Unclear	Low	NA	NA	NA
Nabili <i>et al.</i> ⁽⁵⁷⁾	2016	Unclear	Unclear	Unclear	NA	NA	NA	NA
Nawrot <i>et al.</i> ⁽⁵⁸⁾	2018	Unclear	Unclear	Unclear	NA	NA	NA	NA
Nawrot <i>et al.</i> ⁽⁵⁹⁾	2019	Unclear	Unclear	Unclear	Unclear	NA	NA	NA
Negri <i>et al.</i> ⁽⁶⁰⁾	2017	Unclear	Low	Unclear	Low	NA	NA	NA
Parent-Michaud <i>et al.</i> ⁽⁶¹⁾	2020	Unclear	Unclear	Unclear	Unclear	NA	NA	NA
Pfaller <i>et al.</i> ⁽⁴⁵⁾	2017	Unclear	Low	Unclear	Low	NA	NA	NA
Pinto <i>et al.</i> ⁽⁴⁶⁾	2018	Unclear	Low	Unclear	Unclear	NA	NA	NA
Prigitano <i>et al.</i> ⁽⁴⁷⁾	2017	Low	Low	Low	Low	NA	NA	NA
Reichert-Lima <i>et al.</i> ⁽⁴⁸⁾	2018	Unclear	Unclear	Unclear	NA	NA	NA	NA
Resendiz-Sharpe <i>et al.</i> ⁽¹⁸⁾	2019	Low	Low	Low	Low	NA	NA	NA
Salmanton-García <i>et al.</i> ⁽⁶⁾	2021	Unclear	Unclear	Low	Unclear	NA	NA	NA
Seufert <i>et al.</i> ⁽⁶²⁾	2018	Unclear	Low	Low	Unclear	NA	NA	NA
Sui <i>et al.</i> ⁽¹¹³⁾	2018	High	Unclear	High	NA	NA	NA	NA
Takeda <i>et al.</i> ⁽⁶³⁾	2021	Low	Low	Low	Low	NA	NA	NA
Talbot <i>et al.</i> ⁽⁶⁴⁾	2018	Unclear	Unclear	Unclear	NA	NA	NA	NA
Tsuchido <i>et al.</i> ⁽⁶⁵⁾	2019	Low	Low	Low	NA	NA	NA	NA
vanPaassen <i>et al.</i> ⁽³¹⁾	2016	Low	Low	Low	Low	NA	NA	NA
Wu <i>et al.</i> ⁽⁵⁴⁾	2020	Unclear	Unclear	Unclear	NA	NA	NA	NA
Zhang <i>et al.</i> ⁽⁶⁶⁾	2017	Unclear	Unclear	Low	Unclear	NA	NA	NA

18 NA: not applicable.

19

20 **Table S2. Studies reporting on antifungal susceptibility for *Aspergillus fumigatus*.**

Author	Year	Study design	Study period	Country	Level of care	Population description	Patient No.	No. of isolates	Specimens
Abdolrasouli <i>et al.</i> ⁽³⁴⁾	2018	Laboratory-based surveillance Multi-center	Jan 1998- Dec 2017*	United Kingdom	Tertiary	Mixed and Unselected	NS	Total: 1469 2015-2017: 318	Sputum, BAL
Abdolrasouli <i>et al.</i> ⁽³⁵⁾	2018	Laboratory-based surveillance Single center	April 2014- Mar 2016	United Kingdom	Tertiary	Mixed adult and pediatric patients	135 CF: 74	167	Sputum, Lung cavity tissue, Sternal wound, Tracheal aspirate
Alastruey-Izquierdo <i>et al.</i> ⁽³⁶⁾	2018	Laboratory-based surveillance Multi-center	NS	Spain	Tertiary	HM, SOT, Other cancers, HIV, COPD, CF, Asthma, Other IS conditions, Other respiratory diseases	493	Total: 493 <i>Aspergillus fumigatus</i> : 260	Sputum, Bronchial aspirate, BAL fluid, Tracheal aspirate, Sinuses, Lung tissue, Oropharyngeal swabs, Biopsy specimens,

									Wound exudate, Ear exudate
Ashu <i>et al.</i> ⁽³⁸⁾	2018	Laboratory-based surveillance Single center	Jan-Oct 2015	Canada	University affiliated hospital	NS	71	<i>Aspergillus fumigatus</i> isolates: 195	NS
Borman <i>et al.</i> ⁽³⁹⁾	2020	Laboratory-based surveillance Multi-center	11 Mar - 14 Jul 2020	United Kingdom	NS	ICU patients with COVID-19	719	<i>Aspergillus fumigatus</i> isolates: 46	Respiratory samples
Buil <i>et al.</i> ⁽⁴⁰⁾	2018	Laboratory-based surveillance Multi-center	May 2014-Dec 2015	The Netherlands	University Medical Centres	NS	NS	<i>Aspergillus fumigatus</i> isolates: 487	NS
Bustamante <i>et al.</i> ⁽⁴¹⁾	2020	Laboratory surveillance	Aug 2016-Dec 2017	Peru (2 hospitals)	Tertiary	NS	Total: 201	<i>Aspergillus fumigatus sensu stricto</i> : 143	Sputum, BAL, Bronchial aspirate, EA, Skin and annexes, Miscellaneous

Castanheira <i>et al.</i> ⁽⁴²⁾	2017	Laboratory-based surveillance Multi-center	2014-2015	Global^: Italy, USA, Slovenia, Israel, Australia, Canada, Turkey, Romania, France, United Kingdom	NS	Hospitalised patients with: BSI, Pneumonia, UTI, Skin infections, Intra-abdominal infections	Total: 3557 Pneumonia: 806	<i>Aspergillus fumigatus</i> isolates: 391	NS
Chen <i>et al.</i> ⁽⁴³⁾	2016	Laboratory-based surveillance Multi-center	2010-2015	China	NS	NS	NS	<i>Aspergillus fumigatus</i> isolates Clinical: 317 Environmental: 144	Respiratory samples
Cho <i>et al.</i> ⁽²⁹⁾	2019	Prospective cohort study Single center	Jan 2016-April 2018	Korea	Tertiary	HM patients with IA	207	Clinical pathogens: 82 <i>Aspergillus fumigatus</i> : 38	Sterile sites, Lower respiratory tract

Dabas <i>et al.</i> ⁽²⁵⁾	2018	Prospective cohort study	2012-2016	India	NS	Azole-naive ICH suspected of IA	Proven or probable IA: 706/1416 (49.9%) Culture positive: 122/706 (17.3%)	<i>Aspergillus fumigatus</i> isolates: 32	NS
Deng <i>et al.</i> ⁽⁴⁴⁾	2017	Laboratory-based surveillance Multi-center	2011-2015	China	NS	NS	NS	<i>Aspergillus fumigatus</i> clinical isolates: 159	NS
Espinel-Ingroff <i>et al.</i> ⁽⁴⁹⁾	2018	Laboratory-based surveillance Multi-center	NS	<u>Global</u> ^: USA, Spain, France, Argentina, Australia, Italy, Peru, India, Sweden, Mexico, United Kingdom, Canada,	Tertiary	NS	NS	5, 276	Sterile sites, Other sites, >90% of respiratory specimens were BAL fluid

				Austria, Brazil					
Heo <i>et al.</i> ⁽²⁷⁾	2017	Laboratory-based surveillance Single center	Jan 1999- Dec 2015	USA	Tertiary	HM: 107 And/or Autologous HSCT: 12 Allogeneic HSCT: 34	Total: 107	<i>Aspergillus fumigatus</i> : 150	Sputum, BAL fluid, Tracheal aspirate, Lung biopsy
Jensen <i>et al.</i> ⁽³⁷⁾	2016	Laboratory-based surveillance Single center	2010-2014	Denmark	NS	NS	NS	<i>Aspergillus fumigatus</i> isolates: 1162 AFST: 1094	Primary respiratory samples
Koehler <i>et al.</i> ⁽⁵⁰⁾	2017	Prospective cohort study Multi-center	Sept 2011- Dec 2013	Germany	Tertiary	All patients with AML and ALL	Total: 3067 IA cases: 179	77	BAL
Lass-Flörl <i>et al.</i> ⁽⁵¹⁾	2018	Laboratory surveillance	2007-2017	Austria	NS	NS	NS	338	BAL, Blood,

		Multi-center							Tissue biopsy
Lavergne <i>et al.</i> ⁽⁵²⁾	2019	Laboratory-based surveillance Single center	1 Jan 2015-30 Dec 2015	France	Tertiary	CF patients	Total: 171 <i>Aspergillus fumigatus</i> isolation: 88	Total: 475 <i>Aspergillus fumigatus</i> isolation: 126	Sputum, Bronchial secretions, BAL, Bronchial traps, Pulmonary biopsies, Tracheal aspirate, Pulmonary abscess fluid
Lestrade <i>et al.</i> ⁽³⁰⁾	2018	Retrospective cohort study Single center	2006-2012	The Netherlands	University Medical Centre	Patients receiving intensive chemo for AML or MDS: 182 (42.1%) Allogeneic HSCT recipients: 250 (57.9%)	Total: 432	<i>Aspergillus fumigatus</i> isolates: 12	Sputum, BAL, Biopsy

Lestrade <i>et al.</i> ⁽²⁸⁾	2019	Retrospective cohort study Multi-center	Jan 2011- Dec 2015	The Netherlands	University Medical Centres	Patients with a positive <i>Aspergillus fumigatus</i> culture: 2266 Patients met the case definition#: 196 (8.6%) Proven IA: 43/196 (21.9%) Probable IA: 117/196 (59.7%) Putative IA: 36 (18.4%)	Total: 2266 HM: 103/196 (53%) ICU: 85/196 (43%)	196	Sputum, Bronchial aspirate, BAL, Drain fluid, Sinus biopsy, Lung biopsy, Brain biopsy, Lung autopsy, Tissue biopsy
Lestrade <i>et al.</i> ⁽⁵³⁾	2020	Laboratory surveillance Multi-center	2013-2018	The Netherlands	NS	Unselected patients with positive <i>Aspergillus fumigatus</i> culture	Total: 4496 Azole-resistant isolate: 508	Azole-resistant <i>Aspergillus fumigatus</i> isolates: 640	NS

Messer <i>et al.</i> ⁽⁵⁵⁾	2020	Laboratory-based surveillance Multi-center	2017-2018	From centres world-wide	NS	Patients with: BSI, Pneumonia, Skin infections, Not specified	522	Total; 522 <i>Aspergillus fumigatus</i> species complex isolates: 320 <i>Aspergillus fumigatus sensu stricto</i> : 297	BSI, Skin infections, Respiratory
Mohammadi <i>et al.</i> ⁽⁵⁶⁾	2018	Laboratory-based surveillance Multi-center	Jan 2009 - Nov 2014	Iran	NS	SOT, Granulocytopenia, CLD, COPD, ABPA	172	<i>Aspergillus fumigatus</i> isolates: 172	Lower respiratory tract, Sinuses, Abscess, Biopsy, CSF
Nabili <i>et al.</i> ⁽⁵⁷⁾	2016	Laboratory-based surveillance Multi-center	2013-2015	Iran	NS	NS	NS	Total: 513 Clinical: 213 Environmental: 300	Lower respiratory tract, Sinuses, Cerumen, Nails, Biopsy samples

Aspergillus fumigatus isolates: 150

Clinical *Aspergillus fumigatus* isolates: 71

Nawrot *et al.*⁽⁵⁸⁾

2018

Laboratory-based surveillance

Multi-center

2009-2015

Poland

Tertiary

ICU, Hematology, Respiratory, Internal medicine, Surgery, Diabetes mellitus

109

121

Sputum, Bronchial aspirate, BAL, Bronchial tissue, Pleural fluid, Sinuses, Nasal swabs, Pharyngeal swabs, Pus, Stool, Ear, Ocular swab, Bone,

									Pericardial fluid, CSF, Skin, wound, Wound drain
Nawrot <i>et al.</i> ⁽⁵⁹⁾	2019	Laboratory-based surveillance Multi-center	Sept 2015-Aug 2017	Poland	NS	Respiratory, ICU, Surgical	NS	75	Respiratory tract, Ear, Wound swabs
Negri <i>et al.</i> ⁽⁶⁰⁾	2017	Laboratory-based surveillance Multi-center	1998-2017	Brazil		Patients with proven, probable and possible IA	221	<i>Aspergillus fumigatus</i> isolates: 221	Sputum, Tracheal aspirates, BAL, Lung biopsy, Nasal biopsy
Parent-Michaud <i>et al.</i> ⁽⁶¹⁾	2020	Laboratory surveillance Single center	2000-2013	Canada	Tertiary	Patients at risk of aspergillosis	807	Isolates: 985	BAL, Nasal sinus, Abscess, Induced sputum
Pfaller <i>et al.</i> ⁽⁴⁵⁾	2017	Laboratory-based surveillance	2014	From centres world-wide	NS	NS	606	Total: 606	Not specific for

		Multi-center						<i>Aspergillus fumigatus</i> isolates: 56	<i>Aspergillus fumigatus</i> Overall: BSI, Normally sterile bodily fluids, Tissue, Abscesses, Respiratory tract
Pinto <i>et al.</i> ⁽⁴⁶⁾	2018	Laboratory-based surveillance Multi-center	Jan 2010-Mar 2016	Portugal	Tertiary	Mixed	207	Clinical isolates: 227 <i>Aspergillus fumigatus</i> isolates: 190	Sputum, Bronchial aspirate, BAL fluid, Bronchial lavage, EA, Sinuses, Lung tissue, Biopsy specimen, Wound exudate, Ear exudate,

Vitreous humor,
 Mediastinal drainage,
 Burns wound exudate,
 Pleural fluid,
 Other exudates and fluids

Prigitano *et al.*⁽⁴⁷⁾

2017

Prospective study

Multi-center

Dec 2013-
 May 2015

Italy

Tertiary

CF

220

Aspergillus fumigatus isolates: 423

Sputum,
 Bronchial secretions

Reichert-Lima *et al.*⁽⁴⁸⁾

2018

Laboratory-based surveillance

Single center

1998-2014

Brazil

Tertiary

NS

91

Aspergillus isolates: 228

Aspergillus fumigatus isolates: 168

Sputum,
 Bronchial lavage,
 Ocular secretions,
 Blood,
 Cornea,
 Urine,
 Lung biopsy,
 Pleural fluid,
 EA

Resendiz-Sharpe <i>et al.</i> ⁽¹⁸⁾	2019	Retrospective study Multi-center	2012-2017	Belgium The Netherlands	University Medical Centres	HM patients with <i>Aspergillus fumigatus</i> culture positive proven or probable IA	129	<i>Aspergillus fumigatus</i> isolates: 129	BAL fluid, Sputum, Bronchial aspirate, Biopsy
Seufert <i>et al.</i> ⁽⁶²⁾	2018	Laboratory-based surveillance Multi-center	Jan 2012-Apr 2016	Germany	Tertiary	CF	961	2888	Respiratory specimens
Takeda <i>et al.</i> ⁽⁶³⁾	2020	Laboratory-based surveillance Single center	Feb 2012-Feb 2019	Japan	Tertiary	Prior pulmonary TB, COPD, NTM pulmonary infection, Interstitial lung disease, Lung cancer, Prior thoracic surgery	104	120	Sputum EA, BAL, Surgical samples
Talbot <i>et al.</i> ⁽⁶⁴⁾	2018	Laboratory-based surveillance	2015-2017	Australia	Tertiary	NS	NS	Clinical isolates: 148	Sputum, Pleural fluid, BAL,

		Multi-center						Animal isolates: 21	Bronchial tissue, Biopsy tissue,
								Environmental isolates 185	Cornea, Pulmonary pus
Tsuchido <i>et al.</i> ⁽⁶⁵⁾	2019	Laboratory-based surveillance	July 2017-Jan 2018	Japan	Tertiary	Unselected patients	130	<i>Aspergillus</i> species: 130	Sputum, Bronchial aspirates, BAL,
		Multi-center						<i>Aspergillus fumigatus</i> : 56	Ear, Pus, Skin, Tissue
Van Paassen <i>et al.</i> ⁽³¹⁾	2016	Retrospective cohort study	Jan 2010-Dec 2013	The Netherlands	Tertiary	ICU patients	38	<i>Aspergillus fumigatus</i> isolates: 38	BAL, Lung biopsy, Tracheal aspirate, Sputum
		Single center							
Wu <i>et al.</i> ⁽⁵⁴⁾	2020	Multi-centre, Laboratory-based surveillance	Aug 2011-Mar 2018	Taiwan	Tertiary	Unselected patients with positive <i>Aspergillus fumigatus</i> culture.	297	375	Sputum, Nasal swab, Pleural effusion, BAL, Ear, Urine, Percutaneo

us,
Nephrostomy tube

Zhang <i>et al.</i> ⁽⁶⁶⁾	2017	Laboratory-based surveillance Multi-center	Aug 2012- July 2015	China	Tertiary	Patients with proven or probable IA	126	<i>Aspergillus fumigatus</i> isolates: 126	NS
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21 No.: number; NS: not stated; BAL: bronchoalveolar lavage; CF: cystic fibrosis; HM; hematological malignancy; SOT: solid organ transplant;
22 HIV: human immunodeficiency virus; COPD: chronic obstructive pulmonary disease; IS: immunosuppressive; ICU: intensive care unit; EA:
23 endotracheal aspirate; USA: United States of America; BSI: blood stream infection; UTI: urinary tract infection; IA: invasive aspergillosis; ICH:
24 immunocompromised host; HSCT: hematopoietic stem cell transplant; AFST: antifungal susceptibility testing; AML: acute myeloid leukemia;
25 ALL: acute lymphoblastic leukemia; MDS: myelodysplastic syndrome; Chemo: chemotherapy; CLD: chronic liver disease; ABPA: allergic
26 bronchopulmonary; CSF: cerebrospinal fluid; TB: tuberculosis; NTM: non-tuberculosis mycobacterium.

27 *No data for Jan 2012 to Dec 2015

28 ^Countries with greatest contribution in descending order

29 #Case definition; received antifungal therapy within 30 days of a positive culture, received at least 2 days of antifungal therapy, and could be
30 classified as IA according to the EORTC/MSG or AspICU criteria

31

Table S3. Preventative measures in invasive aspergillosis.

Author	Year	Study design	Study period	Country	Level of care	Population description (N)	No. of patients with pathogen (N)	Preventative measures
Dib <i>et al.</i> ⁽⁶⁷⁾	2020	Retrospective cohort study Single center	Mar 2004- Dec 2016	USA	Tertiary	Patients >18 years of age with an underlying solid tumor, HM, or HSCT within one year of proven or probable IPA diagnosis	<i>Aspergillus fumigatus</i> isolates: (142)	Antifungal prophylaxis was administered more often to patients with HM than to patients with solid tumors: 133/225 (59%) vs. 9/86 (10%); $P < 0.0001$
Prigitano <i>et al.</i> ⁽⁴⁷⁾	2017	Prospective study Multi-center	Dec 2013- May 2015	Italy	Tertiary	CF patients (220)	<i>Aspergillus fumigatus</i> isolates: (423)	13 isolates from 8/97 patients were resistant to at least one azole (prevalence rate of 8.2%). Clinical and environmental isolates showed relatedness using microsatellite testing. Given the probable environmental source of resistance, all isolates from azole-naïve patients should be tested for susceptibility.
Mohammadi <i>et al.</i> ⁽⁵⁶⁾	2018	Laboratory-based surveillance	Jan 2009 - Nov 2014	Iran	NS	Transplant patients, Granulocytopenia, CLD,	<i>Aspergillus fumigatus</i> isolates: (172)	Long-term azole therapy may increase the risk of azole resistance.

		Multi-center				COPD, ABPA. (172)		All 6 resistant isolates were obtained from patients who had prior exposure to azole(s)
Seufert <i>et al.</i> ⁽⁶²⁾	2018	Laboratory-based surveillance Multi-center	Jan 2012-Apr 2016	Germany	Tertiary	CF	(2888)	Long-term azole therapy: 45% of CF patients with azole-resistant <i>Aspergillus fumigatus</i> had previously received azole therapy
Van Paassen <i>et al.</i> ⁽³¹⁾	2016	Retrospective cohort study Single center	Jan 2010-Dec 2013	The Netherlands	Tertiary	ICU patients: (38)	ICU <i>Aspergillus fumigatus</i> isolates: (38)	Resistance mechanism was not detected in 1/16 (6.3%) patients with an azole-resistant <i>A. fumigatus</i> isolate. Need to develop markers of resistance other than the CYP51A gene for rapid detection of resistance. Diagnostic criteria are required for early diagnosis.

33 No.: number; N: number; USA: United States of America; HM: hematological malignancy; HSCT: hematopoietic stem cell transplant; IPA:

34 invasive pulmonary aspergillosis; CF: cystic fibrosis; NS: not stated; CLD: chronic liver disease; COPD: chronic obstructive pulmonary disease;

35 ABPA: allergic bronchopulmonary aspergillosis; ICU: intensive care unit; CYP: cytochrome P450.

36

37 Table S4. Current global distribution of invasive aspergillosis.

Author	Year	Study design	Study period	Country	Level of care	Population description (N)	No. of patients with pathogen (N)	Distribution/prevalence
Salmanton-García <i>et al.</i> ⁽⁶⁾	2021	Retrospective cohort study Multi-center	1 Mar 2020-31 Aug 2020	France, Italy, Germany, The Netherlands, Belgium, Spain, UK, Denmark, Ireland, Switzerland, Austria, Pakistan, Mexico, Brazil, Qatar, Argentina, Australia	NS	Patients with CAPA: (186)	<i>Aspergillus fumigatus</i> isolates: (122)	France 39 (21%), Italy 36 (19.4%), Spain 26 (14%), Germany 23 (12.4%), The Netherlands 14 (7.5%), UK 11 (5.9%), Pakistan 9 (4.8%), Belgium 8 (4.3%), Mexico 6 (3.2%) Brazil 3 (1.6%), Switzerland 3 (1.6%), Denmark 2 (1.1%), Qatar 2 (1.1%)

38

39 N: number; No.: number; UK: United Kingdom; NS: not stated; CAPA: COVID-associated pneumonia.

40

41 **Table S5. Trends in invasive aspergillosis, 2016-2021.**

Author	Year	Study design	Study period	Country	Level of care	Population description	No. of patients with pathogen (N)	Trend
Forsythe <i>et al.</i> ⁽³³⁾	2020	Cross-sectional study	2012-2017	USA	NS	Patients with: Aspergillosis, Coccidioidomycosis, Histoplasmosis, Blastomycosis, Paracoccidioidomycosis, Sporotrichosis, Chromoblastomycosis, Phaeohyphomycosis. Patients who are: Otherwise healthy, Aged >65 years Receiving immunosuppressants, Cancer, Post-transplantation HIV infection.	SM: 33,230 Aspergillosis using ICD-10- CM codes: 37.7%	Prevalence of SM: 2012: 6120 2013: 6080 2014: 5430 2015: 5550 2016: 5600 2017: 5265 (projected)

43 N: number; No.: number; USA: United States of America; NS: not stated; HIV: human immunodeficiency virus; SM: systemic mycosis ICD-10-

44 CM: international classification of diseases- Tenth Revision-Clinical Modification

45

46 **Table S6. Fungal pathogens selected for prioritization.**

Pathogen*

Aspergillus fumigatus

Candida albicans

Candida auris

Candida parapsilosis

Candida tropicalis

Coccidioides spp.

Cryptococcus gattii

Cryptococcus neoformans

Eumycetoma causative agents

Fusarium spp.

Histoplasma spp.

Lomentospora prolificans

Mucorales

Nakaseomyces glabrata (formerly *Candida glabrata*)

Paracoccidioides spp.

Pichia kudriavzevii (formerly *Candida krusei*)

Pneumocystis jirovecii

Scedosporium spp.

Talaromyces marneffeii

47 Spp.: species

48 *In alphabetical order

49

50