

## SUPPLEMENTARY MATERIAL

**Supplementary Table 1:** Variables collected as part of case-based HIV/AIDS surveillance in Europe - 2015 TESSy submission template\*

Variable type	Variable	Description	Reporting
<b>System-related</b>	RecordID	Unique anonymous identifier	Mandatory
	RecordType	Structure and format of the data reported	Mandatory
	RecordTypeVersion	Version of the record type that defines the current structure of the data reported	Optional
	Subject	Disease associated with the reported case (HIV/AIDS for all cases)	Mandatory
	Status	Status is used for updating data; the default is New/Update.	Optional
	DataSource	Surveillance system from which the data on this particular disease originates	Mandatory
	ReportingCountry	Country that reports the HIV case	Mandatory
	DateUsedForStatistics	Date used by the national surveillance organisation in HIV/AIDS case reporting and other official statistics	Mandatory
<b>Diagnosis information</b>	DateOfDiagnosis	Date of first HIV diagnosis; clinical or laboratory diagnosis	Mandatory
	DateOfNotification	Date on which the HIV case was notified to the reporting country	Mandatory
	HIVType	Type of HIV infection	Mandatory
	HIVStatus	Status of HIV infection (prevpos=previously tested HIV positive)	Optional
	Transmission	Most probable route of HIV exposure	Mandatory
	TransmissionPartner	Most probable route of HIV transmission of the partner	Optional
	ProbableCountryOfInfection	Country(ies) where infection of the patient is likely to have occurred	Optional
	FirstCD4Count	CD4 cell count at time of diagnosis	Mandatory
	FirstCD4Date	Date of first CD4 cell count at time of diagnosis	Mandatory
	AcuteInfection	Evidence of recent infection	Optional
<b>Demographics</b>	Age	Age at diagnosis in years	Mandatory
	Gender	Gender of the diagnosed person	Mandatory
	CountryOfBirth	Country of birth of patient	Mandatory
	RegionOfOrigin	Region from which the case originates	Optional
	YearOfArrival	Year patient arrived in the reporting country	Optional
<b>Clinical information</b>	LastAttendanceDate	Date the patient was last seen for HIV-related care	Optional

	ART	Whether patient was on antiretroviral therapy (ART) at the date last seen for care	Optional
	CD4Latest	Last known CD4 count	Optional
	CD4LatestDate	Date of last CD4 count assessment	Optional
	VLLatest	Last known viral load (VL)	Optional
	VLLatestDate	Date of last known VL assessment	Optional
	DateOfAIDSDiagnosis	Date of first AIDS diagnosis	Optional
	AIDSIndicatorDisease	AIDS indicator disease at the time of AIDS diagnosis occurring within two consecutive months from the date of AIDS diagnosis	Optional
<b>Death</b>	DateOfDeath	Date of death due to any cause	Mandatory
	DeathCause	Information on whether the case is alive or deceased (due to AIDS-related and non-AIDS related causes)	Mandatory

*\*Adapted from ECDC and WHO Regional Office for Europe reporting protocol 2015 (9)*

**Supplementary Table 2:** Characteristics of adults diagnosed with HIV in the 31 included European countries by region, 2010-2014

Variables		Western Europe (n=14)		Central Europe (n=9)		Eastern Europe (n=8)	
		n	%	n	%	n	%
Total		87,569		7,571		24,989	
Sex	Men	62,780	72%	5,819	78%	15,301	61%
	Women	24,703	28%	1,603	22%	9,688	39%
Age at diagnosis	15-24	9,324	11%	1,561	21%	2,833	11%
	25-34	27,592	32%	2,964	40%	9,995	40%
	35-44	25,637	29%	1,766	24%	7,895	32%
	45-54	16,019	18%	708	10%	3,307	13%
	55-64	6,445	7%	311	4%	797	3%
	≥65	2,437	3%	82	1%	134	1%
Diagnosis year	2010	17,939	20%	1,134	15%	4,558	18%
	2011	17,945	20%	1,336	18%	4,760	19%
	2012	18,410	21%	1,555	21%	4,810	19%
	2013	17,394	20%	1,670	22%	4,996	20%
	2014	15,881	18%	1,876	25%	5,865	23%
Exposure	Sex between men	34,293	47%	2,730	43%	648	3%
	Heterosexual contact	34,896	47%	2,565	40%	15,406	65%
	Injecting drug use	3,757	5%	1,030	16%	7,573	32%
	Other	697	1%	9	0%	19	0%
Region of origin	Reporting country	34,081	51%	5,853	90%	20,515	85%
	Other Europe	7,596	11%	551	8%	3,618	15%
	Elsewhere	25,593	38%	81	1%	19	0%
First CD4 after diagnosis (cells/μL)	<200	15,025	27%	1,732	33%	906	35%
	200-349	11,399	20%	970	18%	581	22%
	350-499	11,850	21%	954	18%	481	18%
	≥500	18,175	32%	1,625	30.8%	640	25%

*Completeness: sex 99.8% (n=119,894), age at diagnosis 99.7% (n= 119,807), year of diagnosis 100% (n=120,129), exposure 86.3% (n=103,623), region of diagnosis 100% (n=120,129), region of origin 81.5% (n=97,907) and CD4 count 53.6% (n=64,338)*

**Supplementary Table 3:** Differences in demographics and diagnosis characteristics for those with and without reported CD4 and/or date data, 2010-2014

Variables		Total	Missing CD4 data*		CD4 count and date reported		P value**
		N	n	%	n	%	
Total		120,129	52,187		67,942		-
Sex	Men	83,900	33,997	65%	49,903	74%	<0.001
	Women	35,994	18,022	35%	17,972	26%	
Age at diagnosis	15-24	13,718	5,573	11%	8,145	12%	<0.001
	25-34	40,551	17,929	35%	22,622	33%	
	35-44	35,298	15,573	30%	19,725	29%	
	45-54	20,034	8,415	16%	11,619	17%	
	55-64	7,553	3,145	6%	4,408	6%	
	≥65	2,653	1,236	2%	1,417	2%	
Diagnosis year	2010	23,631	10,608	20%	13,023	19%	<0.001
	2011	24,041	10,692	20%	13,349	20%	
	2012	24,775	10,922	21%	13,853	20%	
	2013	24,060	10,233	20%	13,827	20%	
	2014	23,622	9,732	19%	13,890	20%	
Region of diagnosis	Western Europe	87,569	30,144	58%	57,425	85%	<0.001
	Central Europe	7,571	2,252	4%	5,319	8%	
	Eastern Europe	24,989	19,791	38%	5,198	8%	
Exposure	Sex between men	37,671	8,115	21%	29,556	46%	<0.001
	Heterosexual contact	52,867	23,096	59%	29,771	46%	
	Injecting drug use	12,360	7,923	20%	4,437	7%	
	Other	725	225	1%	500	1%	
Region of origin	Reporting country	60,449	26,711	70%	33,738	57%	<0.001
	Other Europe	11,765	4,615	12%	7,150	12%	
	Elsewhere	25,693	6,945	18%	18,748	31%	

\* People for whom the time between diagnosis and first CD4 count could not be calculated - including people missing a CD4 count and date, those that had just CD4 date missing and for whom a partial date could not be calculated (year only)

\*\*  $\chi^2$  test for a difference in proportions

**Supplementary Table 4:** Numerators and denominators used to calculate linkage to care in Europe by demographic and diagnosis characteristics by region, 2010-2014

Variables		Overall			Western Europe			Central Europe			Eastern Europe		
		n*	N**	N†	n*	N**	N†	n*	N**	N†	n*	N**	N†
Total		57,565	60,030	104,796	50,804	52,571	77,975	4,469	4,950	6,858	2,292	2,509	19,963
Sex	Men	42,924	44,694	73,558	38,055	39,319	56,132	3,418	3,769	5,274	1,451	1,606	12,152
	Women	14,611	15,304	31,038	12,719	13,220	21,792	1,051	1,181	1,435	841	903	7,811
Age at diagnosis	15-24	7,070	7,491	12,315	5,771	6,044	8,491	1,039	1,161	1,475	260	286	2,349
	25-34	19,173	20,095	35,547	16,515	17,155	24,833	1,827	2,040	2,724	831	900	7,990
	35-44	16,540	17,183	30,598	14,858	15,328	22,829	1,015	1,104	1,565	667	751	6,204
	45-54	9,791	10,143	17,261	9,019	9,300	14,040	383	421	599	389	422	2,622
	55-64	3,800	3,898	6,509	3,514	3,595	5,609	164	178	248	122	125	652
	≥65	1,187	1,215	2,248	1,125	1,147	2,062	41	46	68	21	22	118
Diagnosis year	2010	10,894	11,381	20,944	10,198	10,603	16,267	590	667	1,055	106	111	3,622
	2011	11,257	11,816	20,913	10,477	10,873	16,001	702	821	1,164	78	122	3,748
	2012	11,760	12,248	21,408	10,638	10,995	16,207	945	1,067	1,433	177	186	3,768
	2013	11,729	12,137	20,542	10,134	10,397	14,967	1,056	1,143	1,517	539	597	4,058
	2014	11,925	12,448	20,989	9,357	9,703	14,533	1,176	1,252	1,689	1,392	1,493	4,767
Exposure	Sex between men	26,955	27,839	34,024	25,291	26,080	30,945	1,495	1,581	2,546	169	178	533
	Heterosexual contact	24,484	25,528	44,598	21,334	22,076	29,923	1,582	1,766	2,211	1,568	1,686	12,464
	Injecting drug use	2,790	3,103	9,857	1,590	1,693	3,032	748	875	956	452	535	5,868
	Other	382	419	626	376	412	602	4	4	6	2	3	18
Region of origin	Reporting country	27,508	28,772	50,812	21,969	22,651	29,271	4,038	4,502	5,246	1,501	1,619	16,295
	Other Europe	6,121	6,421	10,383	4,959	5,145	6,655	372	387	460	790	889	3,268
	Elsewhere	16,181	16,790	22,338	16,135	16,743	22,253	45	46	66	1	1	19
First CD4 after diagnosis (cells/μL)	<200	15,528	16,063		13,423	13,740		1,359	1,505		746	818	
	200-349	11,657	12,163		10,278	10,639		850	949		529	575	
	350-499	12,020	12,549		10,753	11,151		831	920		436	478	
	≥500	18,360	19,255		16,350	17,041		1,429	1,576		581	638	

\* Numerator: number of people promptly linked

\*\* Denominator for main linkage calculation: number of people with a CD4 count and CD4 date after diagnosis

† Denominator for lower bound calculation: number of people with either a CD4 count after diagnosis or missing CD4 data. People with partial (year only) diagnosis or CD4 date excluded.

**Supplementary Table 5:** Proportion of people promptly linked to care by country and region of diagnosis, 2010-2014

<b>Region</b>	<b>Country*</b>	<b>Main estimate</b>	<b>Lower bound†</b>
Western Europe	Country 1	82%	80%
	Country 2	100%	57%
	Country 3	100%	69%
	Country 4	96%	55%
	Country 5	100%	63%
	Country 6	100%	2%
	Country 7	100%	71%
	Country 8	100%	89%
	Country 9	99%	13%
	Country 10	96%	84%
Central Europe	Country 1	100%	2%
	Country 2	99%	87%
	Country 3	96%	87%
	Country 4	97%	85%
	Country 5	84%	67%
	Country 6	87%	81%
	Country 7	96%	55%
	Country 8	94%	65%
Eastern Europe	Country 1	94%	77%
	Country 2	89%	33%
	Country 3	99%	6%
	Country 4	84%	24%
	Country 5	92%	11%

\* Countries have been anonymised with names and denominators removed

† People without a CD4 count included in the denominator and considered not linked

**Supplementary Table 6:** Factors associated with delayed linkage to care in Europe by region, 2010-2014

Variables		Western Europe			Central Europe			Eastern Europe		
		Adjusted odds ratio			Adjusted odds ratio			Adjusted odds ratio		
		OR	95% CI	P value*	OR	95% CI	P value*	OR	95% CI	P value*
Sex	Men	1.00	-	-	1.00	-	-	1.00	-	-
	Women	1.00	0.86 - 1.17	0.988	0.97	0.74 - 1.28	0.849	0.95	0.65 - 1.38	0.781
Age at diagnosis	15-24	1.00	-	-	1.00	-	-	1.00	-	-
	25-34	0.87	0.73 - 1.03		1.09	0.83 - 1.42		0.72	0.44 - 1.20	
	35-44	0.82	0.68 - 0.97		0.92	0.66 - 1.27		0.92	0.54 - 1.55	
	45-54	0.88	0.72 - 1.08		0.91	0.57 - 1.46		0.58	0.32 - 1.06	
	55-64	0.71	0.53 - 0.94		0.88	0.46 - 1.68		0.23	0.07 - 0.79	
	≥65	0.45	0.26 - 0.79	0.012	1.01	0.29 - 3.44	0.870	0.60	0.08 - 4.78	0.036
Diagnosis year	2010	1.00	-	-	1.00	-	-	1.00	-	-
	2011	0.93	0.79 - 1.09		0.98	0.68 - 1.40		13.83	5.17 - 36.95	
	2012	0.82	0.70 - 0.97		0.82	0.58 - 1.16		1.27	0.41 - 3.92	
	2013	0.66	0.55 - 0.79		0.53	0.37 - 0.77		1.56	0.58 - 4.19	
	2014	1.03	0.88 - 1.21	<0.001	0.50	0.34 - 0.72	<0.001	1.43	0.56 - 3.69	<0.001
Exposure	Sex between men	1.00	-	-	1.00	-	-	1.00	-	-
	Heterosexual contact	1.22	1.05 - 1.43		1.95	1.45 - 2.62		1.85	0.88 - 3.93	
	Injecting drug use	1.43	1.08 - 1.90		2.76	2.04 - 3.75	<0.001	3.91	1.84 - 8.31	
	Other	2.49	1.65 - 3.76	<0.001	-	-	-	10.65	0.86 - 132.67	<0.001
Region of origin	Reporting country	1.00	-	-	1.00	-	-	1.00	-	-
	Other Europe	1.13	0.94 - 1.34		0.50	0.29 - 0.86	<0.001	1.95	1.35 - 2.82	<0.001
	Elsewhere	1.14	1.01 - 1.32	0.073	-	-	-	-	-	-
First CD4 after diagnosis (cells/μL)	<200	1.00	-	-	1.00	-	-	1.00	-	-
	200-349	1.40	1.18 - 1.67		1.11	0.81 - 1.51		0.97	0.64 - 1.48	
	350-499	1.57	1.32 - 1.87		1.15	0.84 - 1.57		1.12	0.73 - 1.74	
	≥500	1.87	1.60 - 2.19	<0.001	1.01	0.77 - 1.34	0.784	1.21	0.81 - 1.82	0.738

\*Likelihood ratio test

Grey shading indicates a lack of data or very small cell counts