



Co-funded by the 2nd
Health Programme of
the European Union

From modelling of cost-effectiveness to changes in national HIV testing policies

Guillaume MABILEAU, Julia DEL AMO VALERO, Kristi RÜÜTEL, A. David PALTIEL, Liis LEMSALU, Virginie SUPERVIE, Asunción DÍAZ FRANCO, Jesús MARTÍN FERNÁNDEZ, Rochelle WALENSKY, Kenneth A FREEDBERG, Yazdan YAZDANPANAH

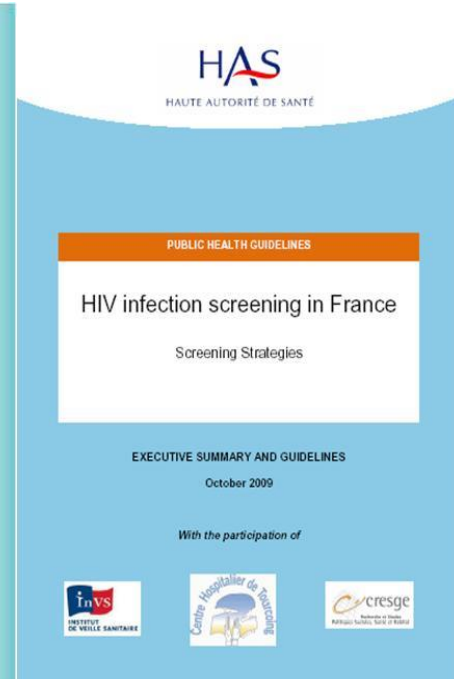
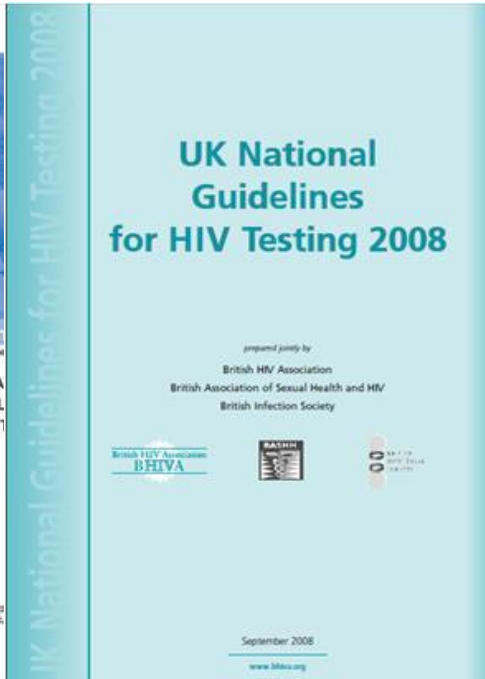
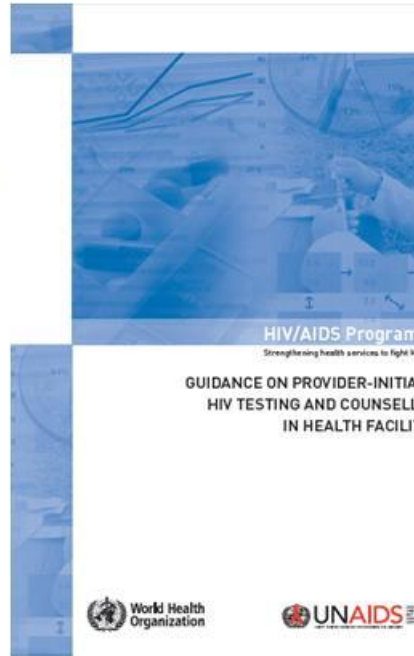
14th September 2017

Working group

- **Centro Nacional de Epidemiología (ISCIII):** Julia del Amo, Asun Díaz, Inma Jarrín .
 - **Escuela Nacional de Sanidad:** Gregorio Barrio
- **Gerencia de Atención Primaria de Madrid:** Jesús Martín Fernández
- **Universidad Rey Juan Carlos, Madrid:** Jesús Martín Fernández
- **Hospital Ramón y Cajal, Madrid:** Susi Pérez-Elías
- **Plan Nacional del SIDA (MSSSI):** Olivia Castillo
- **CIBERESP:** Julia del Amo, Inma Jarrín y Asun Díaz

- **INSERM:** Guillaume Mabileau, Yazdan Yazdanpanah
- **Bichat-Claude Bernard Hospital (Paris):** Guillaume Mabileau, Yazdan Yazdanpanah
- **Department of Health Policy and Management, Harvard T.H. Chan School of Public Health:** Rochelle P Walensky, Kenneth A Freedberg,
- **Yale School of Public Health, New Haven,** David Paltiel
- **Infectious Diseases and Drug Monitoring Department, National Institute for Health Development, Estonia:** Kristi Rüütel, A, LiisLemsalu

HIV testing



Increasing frequency and expanding HIV testing to the general population

Recommendations PNS (MSSSI), Spain 2010-14

Guía de
recomendaciones
para el diagnóstico
precoz del VIH en
el ámbito sanitario

6. Recomendaciones

- 6.1. Personas CON criterios clínicos compatibles de infección por VIH o sida
- 6.2. Personas SIN sospecha de infección por VIH o sida
 - 6.2.1. Oferta RUTINARIA de la prueba del VIH
 - 6.2.2. Oferta DIRIGIDA de la prueba del VIH
 - 6.2.3. Realización OBLIGATORIA de la prueba del VIH

¿Cuándo hay que ofertar la prueba de forma rutinaria?

A toda persona entre 20 y 59 años, sexualmente activa, cuando acuda a una consulta de Atención Primaria y se le indique una extracción de sangre por cualquier motivo, salvo que la prueba se haya realizado previamente, o si ha habido una exposición/conducta de riesgo desde la última vez que se realizó, ya que en este último caso se trataría de una oferta dirigida (ver punto 6.2.2.)

Was this a cost-effective strategy in Spain? ...

We had no data from Spain ...

Collaboration CNE (ISCIII), PNS (MSSSI), INSERM y Harvard Medical School.

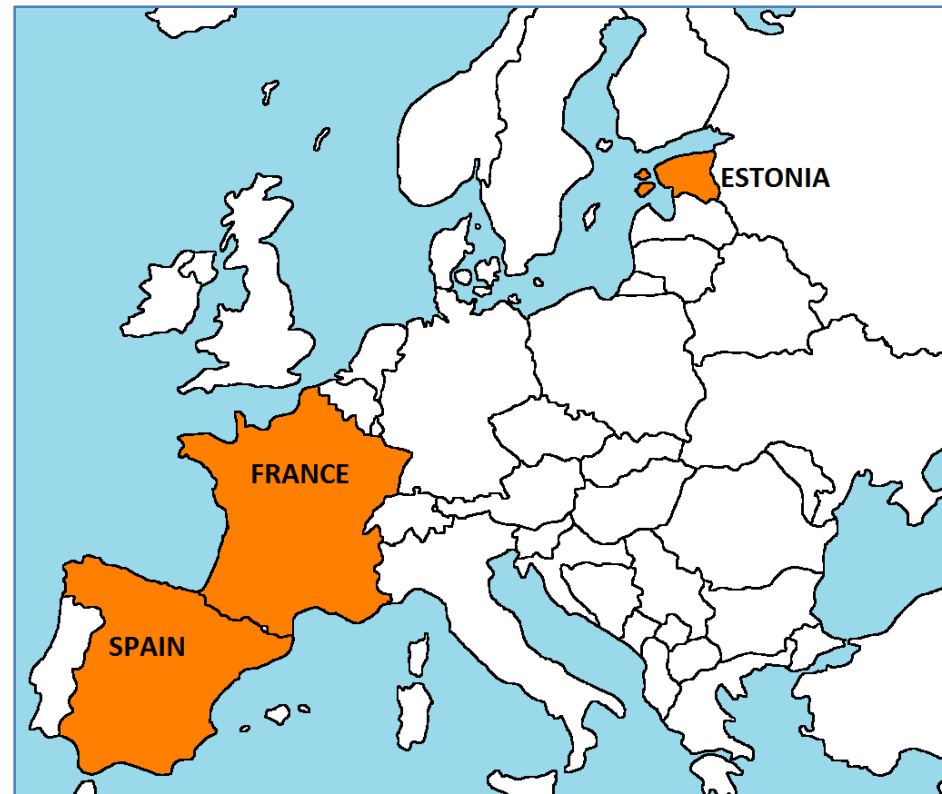
- **Proyectos de Investigación FIS, Río Hortega y OptTest (DG Santé)**

OptTEST Work Package 6

- Objectives
 - To determine the survival benefits, cost and **cost-effectiveness** of different **HIV testing strategies** in different **settings, regions** and **priority groups** in Europe.

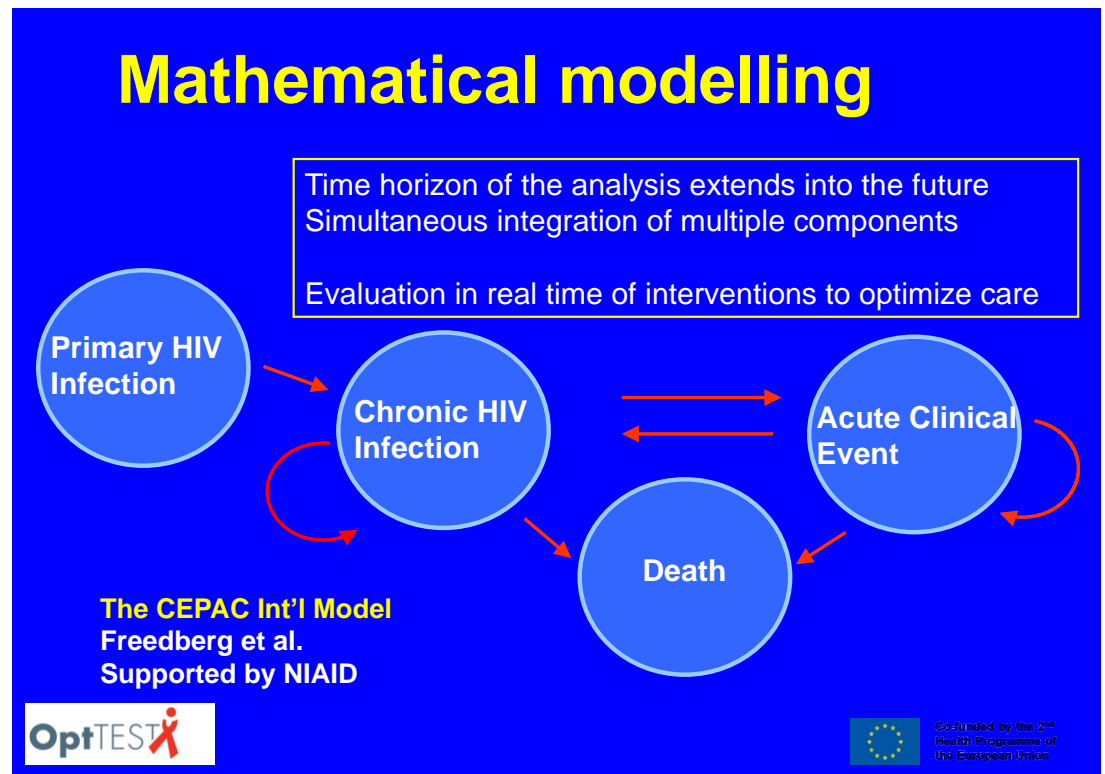
WP6 analysis

- Focus of analysis France, Spain, and Estonia.
- Findings are to be extrapolated to other European countries to produce country- and region-specific guidance for choosing cost-effective testing strategies



Study design

- Mathematical modelling : Cost-Effectiveness of Preventing AIDS Complications (CEPAC), a widely published Monte Carlo simulation model of the detection, natural history and treatment of HIV disease.



Strategies to be tested against « current testing »

- **Populations**

- **High-risk** populations : Men who have Sex with Men (MSM), People Who Inject Drugs (PWID)
- **General** Population

- **Testing frequency**

- One additional test lifetime
- Every 10, 5, 3 and 1 year(s)
- Every 6, 3 and 1 month(s) (high-risk groups)

Cost-Effectiveness analysis

- **Costs** : Costs of HIV testing strategies, related to HIV care, treatment and death (AIDS or non-AIDS)
- **Effectiveness** : Life expectancy in months / Quality-adjusted life expectancy (QALE)
- **Cost-Effectiveness** : Incremental cost-effectiveness ratio (ICER) in €/years of life saved (YLS), and €/QALY:

$$ICER = \frac{\textit{Additional costs}}{\textit{Additional effectiveness}}$$

Definition of what is cost-effective

- For these analyses, a strategy was defined as cost-effective if its ICER was below the country Gross Domestic Product (GDP)
- For Spain this is 24.000€

Data sources

- Time consuming !!!!!!!!!!!!!!!!!!!!!!!

Área de Vigilancia de VIH y Comportamientos de Riesgo



- Sistema de Información sobre Nuevos Diagnósticos de VIH (SINVIH), 2016
- Estimaciones SPECTRUM, ECDC, propias
- Encuesta Hospitalaria, 2016
- Encuesta de Salud y Hábitos Sexuales, 2003
- EpiVIH

Epidemiological data sources

Otros Sistemas de Información sanitaria

Instituto Nacional de Estadística

Sistema de Información del Plan Nacional sobre Drogas 2013

Cohorte de la Red de Investigación de SIDA (CoRIS)

Publicaciones de estudios puntuales

- Moreno S, Prevalence of undiagnosed HIV infection in the general population having blood tests within primary care in Madrid, Spain. Estudio PIVOM. Sex Transm Infect. 2012
- Hurtado I. Trends in HIV testing, serial HIV prevalence and HIV incidence among people attending a Center for AIDS Prevention from 1988 to 2003. Sex Transm Infect. 2007
- Jover-Diaz F. Greater Acceptance of Routine HIV Testing by Patients Attending an Infectious Disease Unit in Spain. J International Association of Physicians in AIDS Care 2012
- Martín-Cabo Gac Sanit. 2012;26(2):116–122. 95%
- Rodríguez B, Revista SESIDA, 2016

Cost data sources

Datos no publicados, cálculos ad-hoc

- Dra Pérez-Elías, Hospital Ramón y Cajal
- Dr Jesús Martín Fernández, contabilidad analítica de AP, CAM

Cartera de servicios del CNM , ISCIII

Berenguer J. Análisis de costes y de coste/eficacia de las pautas recomendadas por GESIDA/Plan Nacional sobre el Sida en 2015 para el tratamiento antirretroviral inicial en adultos infectados por el VIH. EIMC 2015

Datos de Francia ajustados por PIB español

Key-parameters

Parameter	Estonia	France	Spain
Population size (18-69)	895,020	41,732,130	31,868,050
HIV prevalence (%)			
<i>Overall Population</i>	1.3	0.37	0.4
<i>MSM</i>	3.0	17.0	6.2
<i>PWID</i>	55.0	17.5	28.7
<i>Migrants</i>	--	1.3	0.7
Undiagnosed prevalence (%)			
<i>Overall Population</i>	0.4	0.07	0.10
<i>MSM</i>	2.0	2.95	0.62-1.24
<i>PWID</i>	6.0	0.62	3.31-6.62
<i>Migrants</i>	--	0.36	0.17
Incidence /100PY			
<i>Overall Population</i>	0.03	0.02	0.007
<i>MSM</i>	0.08	1.0	0.28-1.0
<i>PWID</i>	6.0	0.13	1.9-3.0
<i>Migrants</i>	--	0.06	0.03
Mean CD4 count at initiation			
<i>Overall Population</i>		419	414
<i>MSM</i>		465	450
<i>PWID</i>	289.0	316	275
<i>Migrants</i>		334	386

Key-parameters

Parameter	Estonia	France	Spain
Screening performance			
Test acceptance rate	95.0%	79.0%	96.0%
Linkage to care rate	50.0%	75.0%	83.1%
Sensibility (ELISA test)		100%	
Specificity (ELISA test)		99.5%	
Cost of HIV test	€ 8.00	€ 41.77	€ 18.45
Cost of ART (annually)			
1 st line	€2,920	€11,810	€8,640
2 nd to 4 th line	€4,750	€13,960	€10,210
5 th line	€7,720	€19,740	€14,450
GDP per capita	€ 20,000	€ 29,000	€ 24,300

Results for the base case analysis

MSM

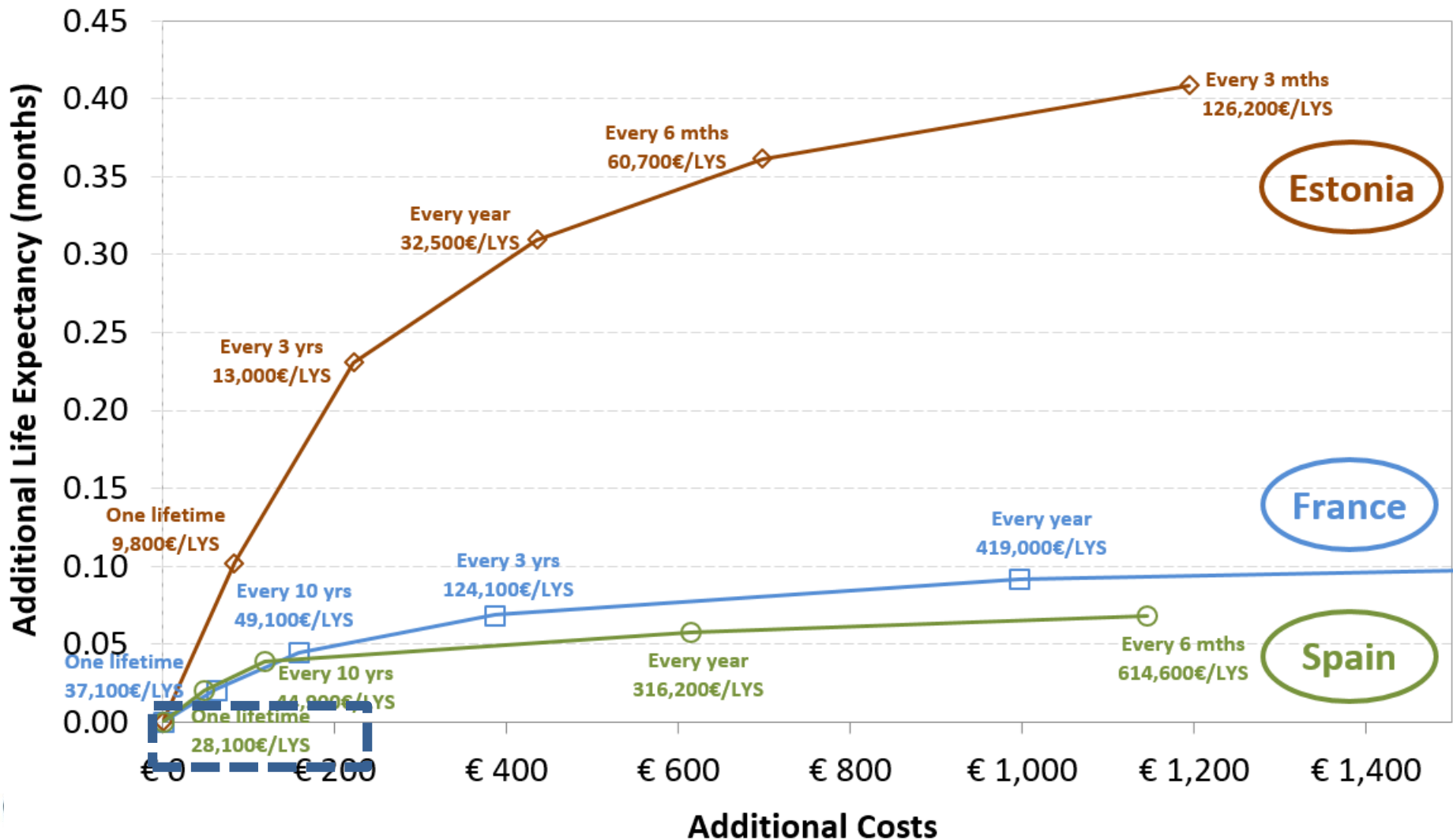
Testing strategies: ¹	Estonia			France			Spain		
	GDP=€20,000			GDP=€29,000			GDP=€24,300		
	LE	Costs (€)	ICER (€/YLS) ²	LE	Costs (€)	ICER (€/YLS) ²	LE	Costs (€)	ICER (€/YLS) ²
Current frequency	359.7	€ 1,736	--	280.9	€ 45,276	--	332.2	€ 12,640	--
One additional lifetime test	360.1	€ 2,057	dominated	281.1	€ 45,615	dominated	332.3	€ 12,645	1,400
Every 10 years	360.2	€ 2,110	dominated	281.8	€ 46,390	17,400	332.7	€ 13,233	13,700
Every 5 years	360.2	€ 2,186	dominated	281.9	€ 46,555	dominated	332.8	€ 13,432	dominated
Every 3 years	360.4	€ 2,277	8,900	282.2	€ 47,011	dominated	332.9	€ 13,595	25,300
Every year	360.6	€ 2,589	16,200	282.9	€ 48,135	23,900	333.2	€ 14,218	31,200
Every 6 months	360.8	€ 2,918	30,000	283.4	€ 49,366	33,100	333.4	€ 14,899	32,500
Every 3 months	360.9	€ 3,458	49,700	283.9	€ 51,014	45,900	333.5	€ 15,940	133,600
Every month	361.0	€ 5,420	230,200	280.9	€ 45,276	165,900	333.6	€ 19,853	439,200

Results for the base case analysis

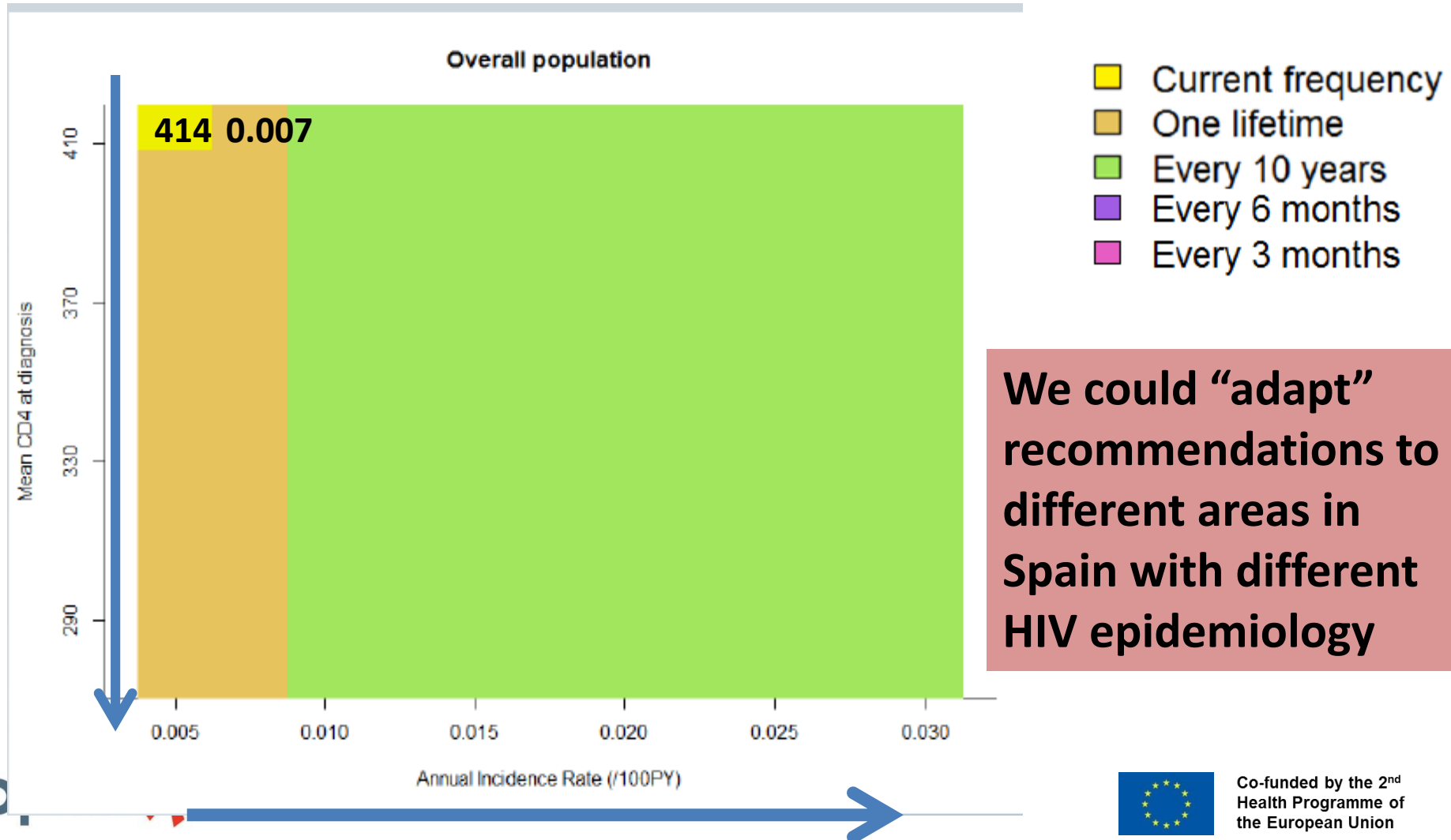
<u>PWID</u>	Estonia			France			Spain		
	GDP=€20,000			GDP=€29,000			GDP=€24,300		
Testing strategies:¹	LE	Costs (€)	ICER (€/YLS) ²	LE	Costs (€)	ICER (€/YLS) ²	LE	Costs (€)	ICER (€/YLS) ²
Current frequency	267.5	€ 36,010	--	332.9	€ 6,761	--	320.4	€ 36,163	--
One additional lifetime test	271.0	€ 38,695	dominated	333.1	€ 7,311	dominated	323.1	€ 40,758	dominated
Every 10 years	273.4	€ 39,795	dominated	333.4	€ 7,640	16,500	325.7	€ 43,875	dominated
Every 5 years	276.5	€ 41,283	dominated	333.6	€ 7,845	19,500	326.8	€ 45,170	dominated
Every 3 years	279.5	€ 42,748	dominated	333.7	€ 8,133	27,700	327.8	€ 46,129	dominated
Every year	286.4	€ 46,384	dominated	334.1	€ 9,035	39,000	329.4	€ 48,111	15,900
Every 6 months	289.7	€ 48,054	6,500	334.2	€ 10,070	97,000	330.2	€ 49,299	18,300
Every 3 months	292.3	€ 49,536	7,000	334.4	€ 12,002	208,700	330.5	€ 50,530	47,900
Every month	294.3	€ 51,418	11,000	334.4	€ 19,329	1,138,300	331.0	€ 54,535	101,700

Results for the base case analysis

General population - Efficiency frontiers (Additional Costs vs. Efficacy)



Resultados: análisis de sensibilidad, población gnal



Conclusion

- **MSM** should be tested every 3 to 12 months in France and Estonia, and every 6 to 36 months in Spain.
- **PWID** should be tested every 3 to 12 months in Spain, and every 12 to 36 months in France. In Estonia, PWID should be tested at least monthly, if not more frequently.
- Current HIV testing in the **general population** should be maintained in France and Spain, and increased in Estonia with an additional test every three years.
- For optimal value, HIV screening strategies in Europe should be **tailored** to each country's epidemic.

Changes in national HIV testing policies

- France :
 - High-risk populations
 - **MSM** should be tested every 3 months
 - **PWID** should be tested every 12 months
 - Migrants from sub-Saharan Africa and the Caraibes should be tested every 12 months
 - General population: HIV testing at least once in the entire life should be maintained with specific attention to
 - Men
 - Regions with a high undiagnosed HIV prevalence