Implementación y evaluación de políticas para el control del tabaquismo en los hospitales

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IMPLEMENTACIÓN Y EVALUACIÓN DE POLÍTICAS PARA EL CONTROL DEL TABAQUISMO EN LOS HOSPITALES

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1. Resumen

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Antecedentes: Varios estudios han demostrado como las políticas de control del tabaquismo favorecen el abandono del consumo del tabaco entre los fumadores, incrementan la aceptabilidad y el cumplimiento de los espacios sin humo. Sin embargo, se desconoce el impacto que las diferentes medidas de control del tabaquismo tienen en los hospitales catalanes.

Hipótesis: 1) La política de espacios sin humo en los hospitales reduce la prevalencia de consumo de tabaco entre los trabajadores, favoreciendo cambios en la actitud y el comportamiento en el cumplimiento de las normativas. 2) La Ley 28/2005 ha contribuido a la progresión y el avance de las políticas de control de tabaquismo en los hospitales y 3) ha fomentado cambios en la disminución del humo ambiental del tabaco (HAT) en los hospitales de Cataluña. 4) Los hospitales de 7 países europeos que han desarrollado el modelo de hospital sin humo de la Red Europea sin Humo (ENSH) presentan niveles bajos de HAT en distintas áreas de hospitalización. 5) El programa de cesación tabáquica dirigido a trabajadores fumadores de los hospitales miembros de la Red Catalana de Hospitales sin Humo (XCHsF) consigue una alta tasa de abstinencia.

Objetivos: 1) Describir los efectos en el consumo de tabaco tras la implantación progresiva de las políticas de control de tabaquismo en un centro hospitalario: el Instituto Catalán de Oncología (ICO). 2) Valorar la progresión de las políticas de control de tabaquismo en los hospitales miembros de la XCHsF antes y después de la implantación de la Ley de medidas de control del tabaco 28/2005. 3) Evaluar el impacto de la Ley de control de tabaquismo 28/2005 en la exposición al HAT en los hospitales públicos catalanes, antes (2005) y después (2006) de su implantación. 4) Describir los niveles de HAT mediante la determinación de partículas $PM_{2.5}$, en una muestra de hospitales europeos en

el año 2007. 5) Evaluar la efectividad de un programa de cesación tabáquica dirigido a los trabajadores hospitalarios.

Metodología: Para conseguir los objetivos marcados se han realizado cinco estudios que incluyen: una serie de encuestas transversales, un estudio pre-post de evaluación de las medidas de control del tabaco, dos estudios de determinación del HAT - uno realizado en Cataluña, y el otro en 7 países europeos- y un estudio de evaluación de la efectividad de un programa de cesación tabáquica coordinado por la XCHsF en 33 hospitales.

Resultados: La prevalencia de consumo de tabaco en el ICO disminuyó del 34,5% en 2001 al 30,6% en el 2006. Entre los médicos la prevalencia descendió del 20,0% al 15,2%, entre las enfermeras del 34,0% al 32,6%, y entre los administrativos del 56,0% al 37,0%. Se produjeron cambios en el patrón de consumo como la reducción del número de cigarrillos y del número de fumadores diarios.

La puntuación media de la implementación de las políticas de control del tabaco en los hospitales fue del 52,4 (IC 95%: 45,4-59,5) en 2005 y 71,6 (IC 95%: 67,0-76,2) en 2007 (aumento del 36,7%). Los hospitales con mayor incremento fueron los hospitales generales (48%), hospitales con >300 camas (41,1%), hospitales cuyos trabajadores fuman entre un 35-39% (72,2%), hospitales con un implantación reciente de políticas de control del tabaco (74,2%).

En los hospitales de Cataluña la concentración media de nicotina disminuyó de 0,23 $\mu g/m^3$ (rango intercuartil: 0,13-0,63) antes de la Ley 28/2005, a 0,10 $\mu g/m^3$ (rango intercuartil: 0,02-0,19) después de la Ley (disminución del 56,5%). Tras la Ley se observaron reducciones significativas en la concentración mediana de nicotina en todas las localizaciones, aunque se continuaron detectando valores de HAT en las entradas de los hospitales, sala de urgencias, escaleras de incendios y cafeterías.

La mediana de las concentraciones de $PM_{2.5}$ en una muestra de 30 hospitales europeos fue de 3,0 $\mu g/m^3$. La mitad de las medidas presentaron valores entre 2,0 a 7,0 $\mu g/m^3$. Los niveles de $PM_{2.5}$ fueron similares entre los diferentes países. Once medidas (5,5%) estaban por encima de 25,0 $\mu g/m^3$, límite recomendado por la OMS para los espacios exteriores.

Los trabajadores de una muestra de hospitales catalanes que entraron en el programa de cesación tabáquica coordinado por la XCHsF presentaron una probabilidad de abstinencia global a los 6 meses de 0,504 (IC 95%: 0,431-0,570). Los hombres obtuvieron mejor abstinencia 0,526 (IC 95%: 0,398-0,651) que las mujeres (0,495 IC 95%: 0,410-0,581). Por grupos profesionales, los médicos obtuvieron una abstinencia más alta (0,659, IC 95%: 0,506-0,811) que las enfermeras (0,463, IC 95%: 0,349-0,576). Los trabajadores con mayor dependencia a la nicotina tuvieron una menor probabilidad de abstinencia (0,376, IC 95%: 0,256-0,495) que los trabajadores con baja dependencia (0,529, IC 95%: 0,458-0,599). Se observa una alta probabilidad de abstinencia en trabajadores que siguieron un tratamiento farmacológico combinado (bupropion y sustitutivos de la nicotina) (0,761, IC 95%: 0,588-0,933).

Conclusiones:

La introducción progresiva de políticas de control del tabaquismo en los hospitales se asocia con una ligera disminución del consumo de tabaco y la modificación del patrón de consumo entre los trabajadores fumadores. La política de espacios sin humo en los hospitales disminuye la percepción de la exposición al HAT e incrementa el cumplimiento auto reportado de la normativa entre los trabajadores. Los niveles de HAT disminuyen en los hospitales tras la entrada en vigor de la Ley 28/2005. La valoración de las concentraciones de nicotina en fase vapor ofrece un sistema de monitorización objetivo y fiable que refuerza el cumplimiento de los espacios sin humo. La presencia de HAT en los hospitales europeos monitorizada mediante $PM_{2.5}$ es baja, a excepción de la hallada en lugares en los que se permite fumar cuya concentración es elevada. Los hospitales miembros de la XCHsF presentan un

mayor control de tabaquismo (medidas mediante el cuestionario europeo self-audit) tras dos años de implantación de la Ley 28/2005 (2007) que los obtenidos antes de la Ley (2005). El programa de cesación tabáquica coordinado por la XCHsF dirigido a los trabajadores hospitalarios fumadores obtiene una alta probabilidad de abstinencia a los seis meses. Los trabajadores tratados con dependencia baja o media, los fumadores de 10-19 cigarrillos al día y los tratados con terapia combinada obtuvieron mejores tasas de abstinencia.

2. Introducción

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2.1.El consumo de tabaco en nuestro medio

El tabaquismo se ha descrito como la gran epidemia silenciosa del siglo XX. Actualmente, ya en pleno siglo XXI continúa siendo uno de los mayores retos de salud pública a escala mundial (1,2). El tabaquismo presenta una alta prevalencia, un significativo impacto en la salud y un elevado coste social y económico (3,4).

De acuerdo con López et al., España se sitúa al final de la fase III del modelo de difusión del tabaquismo, que se caracteriza por la disminución en la prevalencia de consumo de tabaco entre los hombres y el aumento del consumo entre las mujeres (5,6). Los datos de la Encuesta Nacional de Salud (ENS) confirman esta tendencia. Así entre los hombres se observa un descenso relativo medio anual del 2,2% en la prevalencia de fumadores (diarios y ocasionales) [en el que se ha pasado de un consumo entre los hombres del 54,9% en el 1987 al 35,3% en el 2006]; mientras que entre las mujeres se ha producido un ligero aumento del 1,2% en la prevalencia durante el período del 1987 al 2001, seguido de un descenso del 2,9% durante el período del 2001 al 2006 [situando la prevalencia actual en el 23,9%] (5,7). En Cataluña la prevalencia de consumo de tabaco es ligeramente inferior a la del resto de España, con un 34,5% de los hombres y el 24,3% de las mujeres fumadores (8).

A pesar de la disminución progresiva del tabaquismo en nuestro contexto el consumo de tabaco continúa siendo la causa aislada más importante de morbilidad y mortalidad prevenible en nuestro país (9). En el año 2006 se produjeron unas 53.000 muertes atribuibles al tabaquismo en individuos ≥35 años, lo que supone el 14,7% de todas las muertes ocurridas (10).

2.2. Efectos de humo ambiental del tabaco sobre la Salud

El tabaquismo involuntario o pasivo, resultante de la exposición al humo ambiental del tabaco (HAT), también representa un grave riesgo para la salud. Desde principios de los años 80, cuando aparecieron los primeros estudios que relacionaron la exposición pasiva al HAT con un aumento del riesgo de padecer cáncer de pulmón (11,12), se han ido sucediendo investigaciones que han descrito mejor y con mayor detalle los efectos del HAT en la salud. Tras cuatro décadas de investigación la Agencia Internacional de Investigación en Cáncer (IARC) y el Surgeon General Report han sintetizado todo el conocimiento acumulado en sendos informes. En ellos se concluye que la exposición al HAT provoca cáncer, enfermedad cardiovascular y diversos problemas del sistema respiratorio en adulto, así como un aumento del riesgo en la aparición de la muerte súbita del lactante (13,14).

La carga de enfermedad atribuible al HAT se ha estimado en diferentes poblaciones. Se calcula que provoca 19.000 muertes prematuras anualmente en Europa (15). En España se ha calculado que la exposición al HAT en casa y en el trabajo produce entre 1200 y 3000 muertes de cáncer de pulmón y enfermedades cardiovasculares al año (16). Además, se ha demostrado que el consumo de tabaco en espacios públicos y en el medio laboral afecta a la calidad de vida de los usuarios y trabajadores, y genera importantes costes económicos y sociales (13,17-18)

2.3. Políticas para el control del tabaco

A pesar de su magnitud, la epidemia tabáquica puede ser controlada aplicando medidas político-sanitarias (19) como las incluidas en el Convenio Marco para el Control del Tabaquismo (CMCT) (20). Este tratado promovido por la Organización Mundial de la Salud (OMS) es el primer instrumento jurídico internacional en el que se insta a los Estados a tomar medidas a fin de reducir la prevalencia del consumo de tabaco y eliminar la exposición al HAT. Este tratado internacional contiene normas y directrices políticas susceptibles de ser desarrolladas por los gobiernos a nivel local, regional, nacional e internacional. Desde su aprobación en la 56ª Asamblea Mundial de Salud el 21 de mayo del 2003, un total de 168 países se han comprometido a adoptar dichas medidas mediante su firma y posterior ratificación oficial (21). España ratificó el CMCT el 11 de enero del 2005 y el CMCT entró en vigor el 27 de febrero del 2005. El Convenio establece una nueva dimensión jurídica para la cooperación sanitaria internacional y fomenta la adopción de medidas uniformes como las relativas a los precios e impuestos para reducir la demanda de tabaco, la protección de los fumadores pasivos, la regulación del contenido de los productos del tabaco, la publicidad del tabaco o la venta a menores (22).

La OMS ha elaborado el documento "MPOWER" con el fin de guiar en el proceso de implementación de las políticas incluidas en el CMCT. En él se revisan y proponen seis intervenciones que han demostrado su coste-efectividad en el control del tabaco a nivel internacional: (1) monitorizar el consumo de tabaco *(Monitor),* (2) proteger de la población frente al HAT *(Protect),* (3) ofrecer ayuda a los fumadores para el abandono del consumo *(Offer),* (4) advertir de los peligros del tabaco *(Warn),* (5) hacer cumplir las prohibiciones sobre publicidad, promoción y patrocinio *(Enforce),* y (6) aumentar los impuestos al tabaco *(Raise*) (3) (ver tabla 1).

Tabla 1: Políticas e intervenciones del plan de medidas MPOWER

M **MONITORIZAR** VIGILAR EL CONSUMO DE TABACO Actividad transversal **M1** Obtener datos periódicos representativos a nivel nacional basados en la población sobre los indicadores clave del consumo de tabaco en jóvenes y adultos.	**P**	**PROTEGER** A LA POBLACION DEL HUMO DEL TABACO	
		Intervención **P1**	Promulgar y hacer cumplir leyes sobre entornos completamente libres de humo en las instalaciones sanitarias y educativas y en todos los lugares públicos cerrados, incluidos lugares de trabajo, restaurantes y bares.
	O	**OFRECER** AYUDA PARA EL ABANDONO DEL TABACO	
		Intervención **O1**	Fortalecer los sistemas sanitarios para que faciliten asesoramiento sobre el abandono del tabaco en el marco de la atención primaria de salud. Apoyar el establecimiento de líneas telefónicas de ayuda al abandono y otras iniciativas comunitarias, junto con tratamiento farmacológico de fácil acceso y bajo costo, cuando sea conveniente.
	W	**ADVERTIR** DE LOS PELIGROS DEL TABACO	
		Intervención **W1**	Exigir que el etiquetado incluya advertencias eficaces.
		Intervención **W2**	Realizar campañas de publicidad antitabáquica.
		Intervención **W3**	Obtener la cobertura gratuita de las actividades antitabáquicas por los medios de difusión.
	E	**HACER** CUMPLIR LAS PROHIBICIONES SOBRE PUBLICIDAD, PROMOCIÓN Y PATROCINIO	
		Intervención **E1**	Promulgar y hacer cumplir leyes eficaces que prohíban totalmente toda forma de publicidad, promoción y patrocinio directos del tabaco.
		Intervención **E2**	Promulgar y hacer cumplir leyes eficaces que prohíban la publicidad, la promoción y el patrocinio indirectos del tabaco.
	R	**AUMENTAR** LOS IMPUESTOS AL TABACO	
		Intervención **R1**	Aumentar los tipos impositivos para los productos de tabaco, y asegurar que se ajustan periódicamente conforme a las tasas de inflación y aumenten más deprisa que el poder adquisitivo de los consumidores.
		Intervención **R2**	Fortalecer la administración fiscal para reducir el comercio de productos de tabaco.

Adaptado de MPOWER 2008 (3)

El CMCT ha supuesto el inicio de una nueva era en el control global del tabaco, que se ha extendido progresivamente a medida que los países de todo el mundo han incluido dichas normativas en sus marcos legales. Este nuevo escenario ha originado una nueva línea de investigación dirigida a evaluar las distintas fases y modelos del proceso de implementación de éstas políticas. Así, son numerosos los ejemplos de evaluaciones de estas políticas, como los estudios pioneros en California (23-30), o los más recientes en países europeos como Irlanda, Escocia, Italia o España (31-41). En este mismo sentido, la IARC ha promovido un manual para la correcta evaluación de estas políticas (42).

2.3.1. Políticas y medidas internacionales de protección del humo ambiental del tabaco

Las sucesivas evidencias sobre la nocividad del HAT han justificado la necesidad de proteger a las personas de su exposición en lugares públicos y de trabajo. El artículo 8º del CMCT recoge esta recomendación, alentando a los Estados a establecer leyes que procuren la prohibición total del consumo de tabaco en lugares públicos (como son los centros sanitarios), centros de trabajo cerrados, incluyendo bares y restaurantes. En este sentido, se ha demostrado que las medidas voluntarias o de acomodación son ineficaces (43) y que la ventilación y/o separación parcial no protegen ni ofrecen ambientes seguros ni saludables (44,45).

Tras la aprobación del CMCT varios países han reforzado sus normativas legales aplicando la prohibición de fumar en diversos lugares públicos y de trabajo. En Europa 24 países han aprobado nuevas normativas de espacios sin humo desde la aprobación del CMCT en el 2003 hasta noviembre de 2010 (tabla 2). Sin embargo, existe una importante heterogeneidad en la disposición, características y nivel de protección ofrecido por cada una de éstas normativas (46).

Tabla 2. Países europeos con nueva normativa legal sobre "espacios sin humos", período 2004-2010.

MALTA (Abril 2004)
Prohibición de fumar en todos los lugares públicos cerrados incluidos transportes, clubes y restaurantes donde se permiten zonas para fumadores.
IRLANDA (Marzo 2004)
Prohibición de fumar en espacios cerrados (incluidos bares, cafeterías y restaurantes). No se permiten salas designadas para fumar baja ninguna condición. Las prisiones, habitaciones de hotel y los hospitales psiquiátricos están exentos.
NORUEGA (Junio 2004)
Prohibición de fumar en locales y transportes públicos, lugares de trabajo e instituciones en las que dos o más personas se reúnen, y los establecimientos que sirven comidas y/o alcohol. Sin embargo, se permiten habitaciones habilitadas para fumar en algunos lugares de trabajo.
ITALIA (Enero 2005)
Prohibición de fumar en todos los lugares públicos cerrados y lugares de trabajo, lo que incluye el transporte público, bares y restaurantes. Se permiten salas designadas para fumar que deben estar completamente cerradas y ventiladas, con una puerta de cierre automático. Los no fumadores no deben ser obligados a pasar por la sala de fumadores. Además las salas designadas deben asumir no > 50% de la superficie total del restaurante, bar o club.
SUECIA (Junio 2005)
Todos los lugares públicos y de trabajo, incluyendo restaurantes, bares, cafeterías y discotecas, son libres de humo. En enero del 2008 además se prohibió fumar en los centros penitenciarios.

Tabla 2 (Continuación)

ESPAÑA (Enero 2006)
Lugares de trabajo, tiendas, escuelas, centros sanitarios incluidos hospitales, centros culturales, transporte público son libres de humo. Los bares de <100m^2 pueden ser de fumadores o no y los >100m^2 han de disponer de zonas de fumadores y no fumadores completamente separadas, no superando >30% de su superficie. Los centros psiquiátricos pueden habilitar una zona para fumar de uso exclusivo para los pacientes fumadores. Actualmente en proceso de revisión.
REPUBLICA CHECA (Enero 2006)
Prohibido fumar en lugares públicos, en las escuelas, en los centros de entretenimiento cerrados (es decir: teatros, galerías, salas de conciertos, pabellones deportivos, etc), dentro de las instalaciones médicas, en los edificios de la administración pública y en los restaurantes (donde los propietarios deben proporcionar un "espacio" reservado para los fumadores correctamente señalizado con un signo "visible").
BÉLGICA (Enero 2006)
Prohibición del consumo de tabaco en lugares de trabajo. No obstante, se pueden habilitar salas para fumadores, aunque el empleador no está obligado a habilitarlos. En enero del 2007 se prohibió fumar en los restaurantes. Sin embargo, se permiten salas de fumadores siempre y cuando no se sirva comida. Bares de más de 50 metros cuadrados deben proporcionar zonas para fumadores y no fumadores.
REINO UNIDO: ESCOCIA (Marzo 2006)
Prohibición de fumar en lugares cerrados, lugares públicos, incluyendo edificios gubernamentales, lugares de trabajo, estadios deportivos, bares y restaurantes. Se contemplan excepciones en las habitaciones de los huéspedes de los hoteles si el hotel ha designado habitaciones para fumadores previamente. Se prohíbe fumar en zonas al aire libre si están cubiertas al menos al 50% y en cabinas de teléfono.
AUSTRIA (Enero 2007)
Prohibido fumar en instalaciones educativas, transporte público, pero no en todos los lugares de trabajo, bares y restaurantes.

Tabla 2 (Continuación)

LITUANIA (Enero 2007)
Prohibido fumar en restaurantes, bares, lugares donde se sirva comida, clubs (excepto en clubes específicos de puros y pipas) y lugares de ocio nocturno. Fumar está prohibido en transportes públicos excepto en los trenes de larga distancia.
FRANCIA (Febrero 2007)
Prohibición de fumar en todos los lugares públicos y de trabajo, cerrados, incluidos las oficinas, tiendas y centros de salud, transporte público, y todas las instalaciones educativas (escuelas primarias, intermedias y secundarias incluyendo todas las áreas al aire libre tales como áreas de recreo), así como todos los locales utilizados para recopilar, tren o acomodar a los menores de edad. A partir del 1 de enero del l 2008 bares, clubes nocturnos y restaurantes, casinos y tiendas de tabaco también incorporaron la prohibición de fumar. Se pueden habilitar zonas para fumadores siguiendo un procedimiento estricto de habilitación de zonas, en el que están exceptos centros de la salud y locales de atención a menores de edad.
REINO UNIDO: GALES (Abril 2007)
Prohibición de fumar en todos los lugares cerrados públicos y lugares de trabajo.
REINO UNIDO: INGLATERRA (Julio 2007)
Prohibición de fumar en lugares cerrados públicos incluyéndose lugares de trabajo, bares, clubs y restaurantes. En ciertos lugares como: habitaciones de hotel, residencias de ancianos, prisiones, submarinos y escenarios de televisión (si es necesario para la actuación) se permite fumar.
ESLOVENIA (Agosto 2007)
Prohibición de fumar en todos los lugares públicos y centros de trabajo. Están excerptas de la prohibición lugares públicos al aire libre, habitaciones especiales de fumadores en hoteles, prisiones, áreas habilitadas en bares y lugares de trabajo. Dichas áreas para fumar deben seguir estrictos criterios técnicos y no deben sobrepasar más del 20% del establecimiento.

Tabla 2 (Continuación)

DINAMARCA (Agosto 2007)
Prohibición de fumar en lugares de trabajo, espacios públicos interiores, instituciones y escuelas, transporte público y el sector de la hostelería. Sin embargo, hay algunas excepciones. Así, los empresarios pueden decidir que se permita fumar en las salas designadas para fumar, y en los locales donde sólo trabaja una de persona. Todos los restaurantes, cafeterías y lugares para comer son libres de humo, aunque los propietarios podrán crear salas de fumadores designadas o pérgolas/kioscos para fumar siempre y cuando no haya servicio atendiendo. En bares de menos de 40 metros en los que sólo se sirve alcohol el propietario puede permitir fumar en toda el área. También se permite en los hogares de acogida y los centros psiquiátricos.
ALEMANIA (Septiembre 2007)
Prohibido fumar en los edificios públicos y medios de transporte público, así como estaciones bajo la ley nacional. En los Estados federales excepto Baviera se permite fumar en locales de restauración.
PORTUGAL (Enero 2008)
Prohibido fumar en todos los lugares públicos excepto cuando se provee de sistemas de ventilación aérea.
HOLANDA (Julio 2008)
Prohibición en lugares públicos, centros de trabajo y medios de transportes y sectores culturales. No obstante, en el sector de la restauración se permite habilitar lugares designados parar fumar cuando en ellos no se sirve comida o bebida o estén en contacto con los trabajadores.
RUMANIA (Octubre 2008)
Prohibido fumar en los establecimientos de salud, tanto públicos como privados. También está prohibido fumar en lugares públicos cerrados, con excepción de las salas designadas para fumar. En los bares, restaurantes, discotecas y todos los otros espacios con una función similar, se permite fumar en las zonas que cumplan con las normas siguientes: la zona debe cubrir < 50% de toda el área del espacio público, debe estar completamente separada del resto del espacio público cerrado, no debe ser un pasillo o una vía de acceso, y debe tener los sistemas funcionales de ventilación.

Tabla 2 (Continuación)

MÓNACO (Noviembre 2008)
Prohibido fumar en lugares públicos excepto en bares, restaurantes y lugares de ocio nocturno.
AUSTRIA (Enero 2009)
Prohibición en todos los lugares de trabajo, aunque si todos los trabajadores están de acuerdo en permitir fumar se permite el consumo de tabaco. En los restaurantes, bares, discotecas y pubs de > 80m^2 se deben establecer zonas de fumadores y no fumadores. En aquellos de < 50 m^2 el propietario puede decidir permitir fumar o no. En locales de 50 a 80m^2 es opcional bajo ciertas circunstancias.
LATVIA (Mayo 2010)
Prohibido fumar en restaurantes y bares. Fumar también está prohibido en parques, en el perímetro exterior a 10 m de las entradas de instituciones gubernamentales, escuelas y paradas de transporte público. En todos los transportes públicos está prohibido excepto en feries.
GRECIA (Septiembre 2010)
Se prohíbe fumar en todos los lugares de trabajo, transporte, en lugares públicos cerrados incluidos restaurantes, clubs nocturnos, etc., sin ninguna excepción. Casinos y bares de > 300m2 tienen una moratoria de 8 meses.
POLONIA (Noviembre 2010) Prohibido fumar en escuelas, hospitales y centros sanitarios, así como en transportes públicos (incluidos trenes, autobuses, paradas de autobús, etc.). No se permite fumar en el interior de lugares públicos incluidos bares cafés, restaurantes, discotecas, aunque se pueden permitir lugares para fumar cerrados. Además los establecimientos pequeños pueden permitir fumar en todo el establecimiento.
SERBIA (Noviembre 2010)
Prohibido fumar en todos los lugares cerrados públicos incluidos lugares de ocio, restauración, bares, internet, cafés, que deben designar una zona habilitada especial para fumar. Existe prohibición total en hospitales, teatros y salas de espectáculos.

Fuente: Adaptado Smoke free Partnership 2010 (46)

Alguna de ellas prohíben completamente fumar y otras acogen excepciones. No obstante, la literatura demuestra que tan sólo las prohibiciones totales ofrecen protección completa a los no fumadores como a los fumadores (23,47). Estas medidas producen la reducción de los niveles de HAT, que en algunos casos puede llegar a un 80-90% de sus niveles (34,48). Las políticas de espacios sin humo cuentan, además, con un elevado apoyo poblacional que resulta ligeramente inferior entre los fumadores (49). Pese a ello, el acuerdo con la política de espacios sin humo aumenta globalmente tras la implementación de las limitaciones del consumo de tabaco en lugares públicos (50). Así mismo, se ha demostrado como en los países con ingresos elevados esta medida política reduce el consumo de tabaco en un 3-4%. Además los fumadores que trabajan en centros sin humo presentan más del doble de probabilidades de abandonar el tabaco que aquellos que están en centros de trabajo donde se permite (51); así como favorecen cambios en el patrón de consumo, disminuyendo el número de cigarrillos diarios y aumentando en número de intentos para dejar de fumar (52). Finalmente, se han comprobado los efectos que estas medidas ejercen sobre la salud de la población, como la disminución del número de ingresos hospitalarios por afecciones cardiovasculares (36,53-55), y una disminución de la presencia de síntomas respiratorios entre los trabajadores de la hostelería (47).

2.3.2. Política de espacios sin humo en España

En España no fue hasta entrada la década del 1980, con la restauración democrática, cuando tanto el gobierno central como los gobiernos autonómicos, comenzaron a asumir la responsabilidad de regular y prevenir el consumo de tabaco. Se iniciaron entonces las primeras actuaciones políticas que, aunque carentes de un enfoque global, se establecieron con la intención explícita de reducir la accesibilidad, la disponibilidad y la promoción de tabaco (56) .

Los primeros textos legislativos relativos a la protección de espacios y de la salud de los no fumadores corresponden a los Reales Decretos 192/1988 y 486/1997 (57,58)

A mediados del 1990 nace el Comité Nacional para la Prevención del Tabaquismo (CNPT) como una organización nacional global formada por la alianza de varias organizaciones vinculadas a la prevención y el control del tabaquismo. Desde sus inicios el CNPT ha orientado e influido positivamente en el avance de las políticas públicas relacionadas con el tabaco. Como medida inicial, el CNPT elaboró el Libro Blanco sobre el tabaquismo en España. Posteriormente, contribuyó a generar documentos estratégicos sobre aspectos clave para el control del tabaquismo como la publicidad, la fiscalidad, y la influencia de las políticas públicas. En su interacción con el Ministerio el CNPT influyó en la aprobación del Plan Nacional de prevención del Tabaquismo del 2003 (59) y, más tarde, medió en la Ley de medidas sanitarias frente al tabaquismo de 2005, que concreta aspectos regulatorios previstos por el Plan (56,60).

Finalmente, el 26 de diciembre del 2005 se aprobó la Ley 28/2005, de medidas sanitarias frente al tabaquismo y reguladora de la venta, el suministro, el consumo y la publicidad de los productos del tabaco (61). La aprobación de esta Ley respondía a la situación histórica del momento (22,62,63). Por una parte, al hacerse ampliamente extensivo la nocividad del humo ambiental del tabaco (HAT) (13,14); y, por otra, debido al sólido compromiso vinculante adquirido por España tras ratificar el Convenio Marco (CMCT, 2003) de la OMS**.** Este nuevo marco legal establece medidas más integrales y refuerza la política de espacios sin humo, delegando la responsabilidad de implantar intervenciones preventivas y de cesación a las Comunidades Autónomas.

2.4. Las políticas de control de tabaquismo en los hospitales: el proyecto "Hospital sin Humo"

Los hospitales deberían ser un ejemplo de buena práctica en el control y el cumplimiento de las políticas de control del tabaquismo (64-66). Así, además de liderar la implementación de espacios sin humo promoviendo ambientes saludables a pacientes, visitantes y trabajadores, deberían incluir, otras políticas entre las que se han descrito (67-71):

- Asegurar la vigilancia y control del cumplimiento de los espacios sin humo,
- Ofrecer programas para la cesación del consumo de tabaco a los trabajadores. pacientes y visitantes del centro,
- Educar a los profesionales sanitarios en intervenciones eficaces para el abandono del tabaco y
- Promover una sociedad sin tabaco haciendo del centro hospitalario un auténtico modelo de organización sin tabaco.

A principios de los años 1990, debido al incumplimiento sostenido de los espacios sin humo y la ausencia de intervenciones de prevención y cesación tabáquica en los hospitales, surgieron dos iniciativas internacionales paralelas con las que se pretendía incrementar el rol modélico de las organizaciones hospitalarias.

La primera iniciativa, desarrollada en Estados Unidos, se inició en 1993 cuando los hospitales americanos se constituyeron sin humo (*smokefree*) siguiendo las medidas prescritas por la Joint Commission on Accreditation of Health Care Organizations (JCAHO) (72-74). La evaluación de esta experiencia demostró que, además de proteger a los trabajadores, visitantes y pacientes, los espacios sin humo desencadenan un aumento de los intentos de abandono. Sin embargo, sin una ayuda específica las recaídas son tan frecuentes como en los hospitales donde no se aplican medidas de control (75-79).

La segunda, desarrollada en Europa, nació de la colaboración entre la Agencia de Asistencia Pública de Hospitales de Paris (AP-HP) y la Liga Europea contra el Cáncer. Así, en 1997 se fundó la Red Europea de Hospitales sin Humo (European Network for Smoke-free Hospitals, ENSH). Esta iniciativa surgió con el fin de dinamizar las actividades contra el tabaco en los hospitales europeos, que pese contar en algunos casos con leyes en las que se prohibía fumar, estaban lejos de ser completamente sin humo, presentando frecuente incumplimiento y altas tasas de consumo de tabaco entre su personal.

El propósito de la ENSH era construir una acción estratégica contra el tabaco en los hospitales europeos que incluyera la implicación de las autoridades sanitarias mediante la creación de redes regionales o nacionales. La ENSH desarrolló el Código Europeo de los "Hospitales sin Humo" que incluye un decálogo de medidas para avanzar eficazmente en el control del tabaquismo en las organizaciones sanitarias (tabla 3) (80). Progresivamente, y tras el intercambio de experiencias entre los países integrantes se elaboraron una serie de materiales destinados a guiar a los hospitales y redes emergentes en la correcta implementación de estas políticas. Además, se diseñaron instrumentos para evaluar el cumplimiento y progresión de las políticas entre sus hospitales miembros como el cuestionario de autoevaluación self-audit que evalúa las medidas de control de tabaquismo adoptadas en los hospitales de acuerdo a los estándares de la ENSH (tabla 4).

En definitiva, el modelo de "Hospital sin Humo" desarrollado por la ENSH ofrece estándares claramente definidos e instrumentos para implementar y evaluar políticas integrales (66,81). La iniciativa consiste en una aproximación paso a paso que los hospitales deben adoptar para llegar a cumplir plenamente el Código y los Estándares de un "Hospital sin Humo". De acuerdo con la guía de implementación de la ENSH se requiere una estrategia de intervención planificada que abarque transversalmente la institución y que tenga en cuenta los factores organizacionales, de grupo e individuales que predisponen, favorecen y refuerzan las conductas de limitación del consumo de tabaco (66).

Un proceso de cambio de estas características precisa de un comité local que cuente con el apoyo de la dirección el hospital. El comité asegura el buen funcionamiento de las iniciativas y planifica el desarrollo de actuaciones de prevención y control del tabaquismo en el hospital, incluyendo la cesación tabáquica de los profesionales y pacientes.

Actualmente, el proyecto se ha refundado convirtiéndose en una red internacional para el control del tabaco en los centros sanitarios (ENSH- Global Network for Tobacco free Health Care Servicies) sin ánimo de lucro. Dicha organización está regulada por unos estatutos registrados bajo la legislación belga. Hasta el momento la red está constituida por 17 miembros, 11 miembros corporativos y 6 miembros asociativos, que se comprometen a desarrollar el proyecto de acuerdo al código y los estándares desarrollados por la ENSH. Además, desde octubre del 2009 la Red Catalana de Hospitales sin Humo coordina este proyecto desde el Institut Català d'Oncología en L'Hospitalet del Llobregat que ejerce de sede actual del proyecto.

Tabla 3: Código Europeo de Hospitales sin Humo.

1. Implicar a los responsables de la toma de decisiones y sensibilizar al personal. Informar a todo el personal y a los pacientes.
2. Crear un comité de prevención del tabaquismo. Definir una estrategia y coordinar las actuaciones.
3. Establecer un plan de formación para todo el personal y formarlos en el abordaje del paciente fumador.
4. Proporcionar medios para la deshabituación tabáquica de pacientes y personal, y garantizar el seguimiento y soporte de todos ellos.
5. Establecer un plan de delimitación de zonas de fumadores alejadas de las de las áreas clínicas y de recepción.
6. Adoptar una señalización apropiada que incorpore carteles, indicaciones y folletos, y suprimir cualquier elemento incitador del consumo de tabaco (ceniceros, venta de tabaco, etc.).
7. Proteger y promover la salud en el trabajo de todo el personal del hospital.
8. Fomentar iniciativas para que el hospital asuma su rol de promotor de la salud.
9. Actualizar y ampliar la información de acuerdo con las políticas que vayan estableciéndose. Garantizar la continuidad y definir instrumentos de evaluación: asegurar la calidad.
10. Primero convencer, después obligar aplicando la ley, si es necesario. Tener paciencia!

Fuente: ENSH (82)

Tabla 4: Principales Instrumentos de la ENSH

- **La Guía Europea para la Implementación de Hospital sin Humo**

  Un manual y 6 anexos que describen la iniciativa y las acciones necesarias para desarrollar el modelo "Hospitales sin Humo". Además, los documentos anexos están dedicados a temas monográficos del proyecto con el objetivo de justificar, dar instrumentos útiles y facilitar la creación de redes nacionales:

  1) El primero dedicado a "¿Por qué un hospital sin tabaco?".
  2) El segundo dedicado a "La organización de los espacios".
  3) El tercero sobre "La señalización".
  4) El cuarto en relación "A la prevención del riesgo de incendio".
  5) El quinto en relación "Creación de una Red Nacional"
  6) El sexto sobre "El tabaquismo y los profesionales de la salud".

- **El Cuestionario de Evaluación de la Prevalencia** del consumo de tabaco para trabajadores de los centros hospitalarios.
- **El Cuestionario de Autoevaluación que evalúa las políticas/medidas destinadas a controlar el tabaco en el hospital**. En total 10 indicadores que calculan la implementación del proyecto mediante 34 ítems puntuables entre una escala del 0 al 3 (siendo 0= no desarrollado y 3= completamente desarrollado). Los 10 principales indicadores evaluados correspondientes a los Estándares de calidad del proyecto son: Compromiso, Comunicación, Educación y Formación, Identificación de los fumadores y apoyo al abandono del tabaco, Control del Consumo, Ambiente, Lugares saludables, Promoción de la Salud, Seguimiento, Desarrollo del proyecto. El Cuestionario de autoevaluación ha sido recientemente actualizado y cuenta con 42 ítems puntuables del 1 al 4. Sin embargo, para las investigaciones de esta tesis se utilizó el primer cuestionario.
- **Los Estándares o Criterios de Calidad** para alcanzar el pleno cumplimiento de las 10 políticas para la implementación de un "Hospital sin Humo". Que indican las acciones que deben desarrollarse para el cumplimiento de cada política y su correspondiente indicador de cumplimiento.

Fuente: Elaboración propia

2.5. Situación en los hospitales catalanes

En Cataluña, antes de la aprobación de la Ley 28/2005, la prohibición de fumar en los centros sanitarios ya estaba doblemente regulada. Por una parte, por la legislación autonómica desde el año 1985 (83), y por otra, por la legislación española desde el 1988 (57). Sin embargo, se permitían salas para fumadores y áreas de fumadores en las cafeterías de los hospitales. Algunos trabajos realizados antes de la Ley 28/2005 recogen las principales dificultades en el avance de las políticas de control del tabaco en los centros hospitalarios en nuestro país:

a) El incumplimiento de los espacios sin humo

En los últimos años se ha realizado algunos estudios observacionales que han evaluado la presencia de humo ambiental del tabaco (HAT) en lugares públicos, entre ellos hospitales (84-86). En todos ellos, se presentaban indicadores de incumplimiento de los espacios libres de humo en los hospitales como presencia de colillas, olor a tabaco, detección de personas fumando e incluso la presencia de nicotina en el ambiente procedente de la combustión de cigarrillos.

Antes de la aplicación de la Ley, un estudio realizado en Barcelona detectó en varios hospitales nicotina ambiental en salas de espera, pasillos y salas de descanso del personal, presentando una concentración más elevada en cafeterías tanto de personal como de público general, que por entonces permitían fumar (87).

b) El elevado consumo de tabaco entre la población

Como ya se ha comentado, en Cataluña la prevalencia de consumo de tabaco entre la población general es del 34,5% en los hombres y 24,3% en las mujeres (8). El elevado consumo poblacional se ha relacionado con la creación de la falsa percepción de que fumar es una conducta normalizada, habitual y aceptada socialmente (88). Por todo ello, la falta de desnormalización del

tabaquismo en la sociedad representa una barrera para su control también en los hospitales.

c) La elevada prevalencia de pacientes hospitalizados fumadores

Un trabajo realizado en el Hospital Universitario de Bellvitge puso de manifiesto que aproximadamente un tercio de los pacientes ingresados eran fumadores. Tras la implantación del programa "Hospital sin humo" el 71,9% (IC 95%: 63,9–79,9) de los fumadores se mantenían sin fumar en 2002 y el 60,1% (IC 95%: 50,9–69,3) en 2004. Las conclusiones de esta investigación indicaban que la admisión en un hospital con política interna de espacios sin humo no garantiza por sí sola que los pacientes no fumen durante su hospitalización. Los pacientes con mayor dependencia y con baja motivación para dejar de fumar necesitan además ayuda durante su estancia hospitalaria para evitar la aparición del síndrome de abstinencia a la nicotina durante su período de hospitalización (89). Este trabajo, al igual que las principales guías de práctica clínica (90-92) y otras experiencias fuera de nuestro contexto (67,70,93), sugieren diseñar programas de atención al tabaquismo al paciente hospitalizado (94-96).

d) La elevada prevalencia de consumo de tabaco entre los profesionales sanitarios, ligada a la falta de formación en la atención del tabaquismo

A pesar de que en la última década se ha producido una reducción del consumo de tabaco entre los llamados colectivos ejemplares (médicos, enfermeras, farmacéuticos y docentes) en la década de los 80 presentaban prevalencias superiores a la población general.

En 1998, un estudio epidemiológico realizado a profesionales sanitarios del territorio Insalud, detectó por primera vez cómo los médicos mostraban una prevalencia 2 puntos por debajo a la obtenida en población general (por entonces del 35,7%) (58).

En Cataluña, donde la prevalencia del consumo de tabaco se viene monitorizando desde el año 1981, se ha producido una disminución de 28,3 puntos en el porcentaje de consumo entre el colectivo médico, pasando del 52,8% (en 1982) al 24,5% (en 2002).

Entre los farmacéuticos, de 1990 a 2002 la prevalencia de fumadores ha disminuido 11,9 puntos porcentuales, alcanzando el 20,4% en el año 2002. En el colectivo de enfermería también se ha observado una evolución positiva con una reducción de 7,3 puntos porcentuales, aunque su actual prevalencia es bastante superior a la de los médicos (35,1%). De estos datos se desprende como el colectivo médico fuma menos que la población general y el colectivo de enfermería está al mismo nivel de consumo que la población general. En comparación con los profesionales de la salud de la Región Europea, tanto en España como en Cataluña, la prevalencia del consumo de tabaco entre el colectivo sanitario es 10 puntos más elevada (97).

Una encuesta realizada en 2003 en varios países indicó que la prevalencia de tabaquismo entre enfermeras y médicos responde al nivel de las actividades de control del tabaquismo del país (98). Así en los países donde está descendiendo la prevalencia del tabaco, también disminuye el consumo entre los profesionales. Por ejemplo, en los Estados Unidos, Australia y Canadá, la prevalencia del consumo en médicos se ha reducido sustancialmente llegando a niveles de consumo en estos colectivos entre el 5 al 10% (99-101). Por el contrario en aquellos donde la prevalencia del tabaco va en aumento o es estable, también está aumentando el consumo de tabaco entre los profesionales de la salud, principalmente entre las mujeres (98).

Por su parte, la OMS promueve que los profesionales de la salud sean modelos en el control del tabaco para la sociedad (102), respetando las normativas y ofreciendo ayuda a los fumadores (90). Varios autores han identificado a nivel internacional los retos en conseguir un rol activo entre los profesionales de la salud como son: la ya citada alta prevalencia, la falta de formación y el no seguimiento de protocolos estandarizados en los centros hospitalarios (103,104). Según la Encuesta Mundial de Profesionales de la Salud sólo del 5 al 37% de los estudiantes de medicina, enfermería y psicología cuentan con formación específica sobre tabaquismo (105).

Pero además, existen otros problemas propios en nuestro país como la escasa sensibilización del colectivo profesional, el discreto papel dinamizador de las organizaciones profesionales y el bajo dinamismo y coordinación de las actividades entre las instituciones y la administración pública (56).

e) Escasa sistematización de las intervenciones de ayuda al paciente fumador hospitalizado

La hospitalización puede incrementar la motivación del fumador a dejar de fumar, especialmente si el motivo de ingreso está relacionado con el tabaco y se promueven políticas de control del tabaco en la organización sanitaria (68,70). Las intervenciones de cesación tabáquica en los hospitales incluyen, por una parte, la intervención motivacional para conseguir cambios en el comportamiento, y por otra, el tratamiento farmacológico con terapia sustitutiva de nicotina, bupropion o la combinación de ambos (68,90), y de forma más recientemente la vareniclina.

El último metanálisis realizado por la Colaboración Cochrane (2007) concluye que ofrecer terapia sustitutiva y seguimiento al mes son determinantes para la efectividad de la intervención. Sin embargo, la efectividad de estas intervenciones en la práctica diaria es menor y constituye un reto en la dinámica asistencial de los hospitales (70).

Un estudio reciente en nuestro contexto estima como el 45,1% (IC 95%: 31,9%-58,3%) de los pacientes hospitalizados son fumadores, y como la Ley 28/2005 no ha favorecido la disminución del consumo de tabaco en los pacientes ingresados sino que ha aumentado 9 puntos porcentuales (106). A pesar de ello tan sólo el 38% de los pacientes hospitalizados fumadores afirman haber sido preguntados por su consumo tabaco (107). Este dato sugiere que la mayoría de los fumadores no son detectados y por consiguiente no se les ofrece ningún tipo de intervención o ayuda para dejar de fumar durante su estancia hospitalaria.

Fuera de nuestras fronteras se han realizado estudios de carácter cualitativo para evaluar las dificultades organizativas de trasladar las intervenciones para dejar de fumar a la práctica diaria. Una investigación etnográfica mostró cómo las estrategias de protección del HAT se integraron en la organización como parte de la cultura organizativa, pero no sucedió lo mismo con las estrategias de ayuda al fumador (108).

El análisis de los registros médicos y enfermeros indicaron que, aunque se realizaba la anamnesis, en pocos casos se ofrecía ayuda. Uno de los motivos apuntados por esta investigación fue que los profesionales sanitarios no consideraban esta intervención una de sus responsabilidades en la práctica asistencial. En Canadá una experiencia para trasladar las intervenciones a la rutina diaria hospitalaria sugiere como la formación, los protocolos internos e incluir esta prestación en la cartera de servicios son tres elementos útiles para mejorar la sistematización (93).

2.6. El Proyecto Hospitales sin Humo como iniciativa para dinamizar el control de tabaco en los hospitales catalanes

Tal y como se ha revisado, los hospitales tienen una importante tarea en el diseño y ejecución de iniciativas de control del tabaco (64,67). Sin embargo, coexisten varias barreras que dificultan la implementación de medidas de control del tabaquismo en las organizaciones hospitalarias.

Algunos hospitales en Cataluña iniciaron programas piloto dirigidos a incrementar el cumplimiento de los espacios sin humo y ofrecer ayudar para dejar de fumar a sus trabajadores fumadores (109). A pesar de sus buenos resultados se trataban de iniciativas aisladas no coordinadas entre los hospitales y la administración pública.

En el año 1999, tras una experiencia en su centro de l'Hospitalet, el Institut Català de Oncologia (ICO) inició un proyecto de dinamización de los hospitales en el control del tabaquismo mediante la creación de la Red Catalana de Hospitales sin Humo (XCHsF) (66). Esta iniciativa de salud pública tiene como objetivo diseminar y homogenizar las intervenciones de control del tabaco en el territorio catalán.

La XCHsF ha adaptado el código y estándares de la ENSH y ha difundido el modelo de "Hospital sin Humo" entre los hospitales públicos catalanes (XHUP) (66,81). El proyecto se adapta a las características de cada centro, que debe constituir un comité promotor que vele por su avance y buena marcha en el sí de la organización. Para la correcta implementación, la Red provee asesoramiento experto, diseña y facilita la realización de programas de cesación tabáquica, ofrece formación, promueve el intercambio de experiencias y, facilita la comunicación y la diseminación de iniciativas en red entres sus hospitales miembros. En definitiva, la XCHsF promueve de forma coordinada la implantación de políticas de control de tabaquismo entre los hospitales de Cataluña.

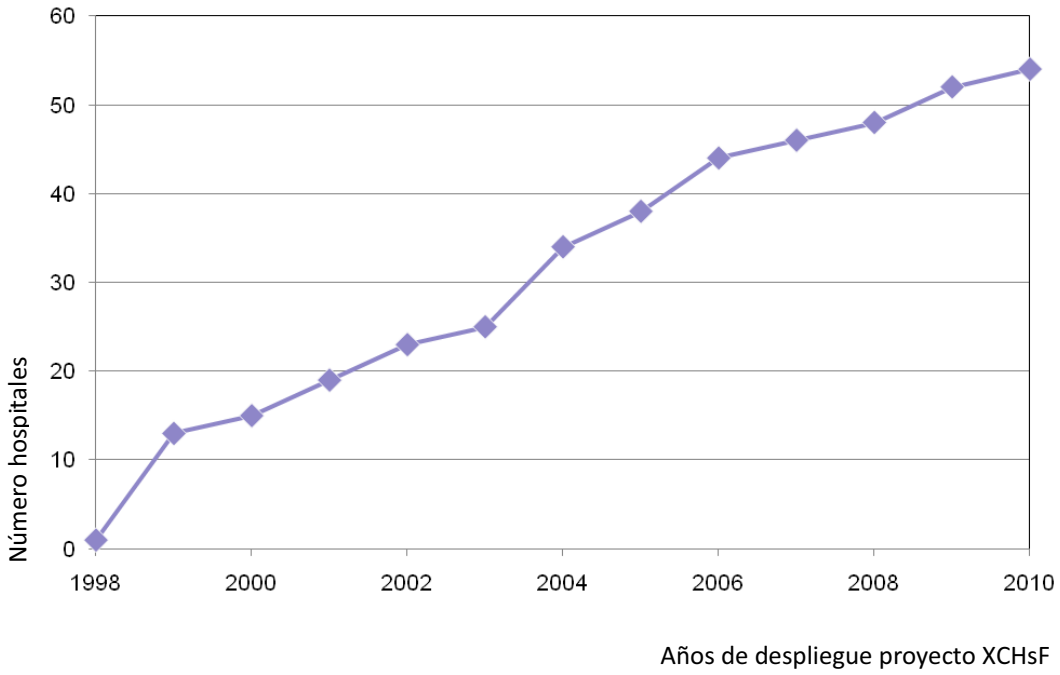
En la actualidad [noviembre 2010], 61 hospitales catalanes, de los que 54 son hospitales de la XHUP, son miembros de la XCHsF. Como puede apreciarse en la Figura 1, el número de miembros ha aumentado en los 10 años de funcionamiento. En 2006, cuando se iniciaron los estudios que forman esta tesis, el número de miembros era ya de 49. Cabe mencionar que desde el año 2005 las actividades de la Red se inscriben en un convenio entre el ICO y el Departament de Salut, que ha apoyado decididamente su desarrollo.

La XCHsF estimula la progresiva implementación de las medidas de control del tabaco que un hospital debería aplicar tanto de carácter pasivo (cumplimiento de la normativa) como activa (formación, programas de atención al fumador, entre otras).

Entre las principales líneas de actuación de la XCHsF están:

- Asegurar el control de espacios sin humo en los hospitales, y disminuir la visibilidad del consumo de tabaco en las entradas y proximidades.
- Dotar de formación a los profesionales sanitarios en el abordaje del tabaquismo, teniendo en cuenta los niveles de intensidad y atención en el ámbito hospitalario.
- Implicar a los profesionales de la salud en el control del tabaquismo.
- Implementar programas de ayuda al trabajador fumador para disminuir la prevalencia del consumo de tabaco en los centros.
- Ofrecer programas globales e integrales de ayuda a la deshabituación tabáquica al paciente y su familia fumadora.
- Garantizar la atención continuada de los pacientes fumadores atendidos en el hospital una vez sean dados de alta mediante la correcta derivación a la atención primaria.
- Ofrecer programas de ayuda a los pacientes vulnerables como pueden ser: embarazadas, pacientes crónicos y pacientes psiquiátricos.

Figura 1. Numero de hospitales adheridos a la Red Catalana de Hospitales sin Humo 1998-2010



En el 2005, la Red puso a disposición de sus hospitales dos programas para la deshabituación tabáquica (PDT). El PDT para trabajadores, sanitarios y no sanitarios, implantado en la actualidad en 40 de los 61 hospitales de la Red, y el PDT para pacientes hospitalizados, que se ha implantado ya en 17 hospitales. Estos programas ofrecen formación a los profesionales, material educativo, fármacos para realizar la intervención (cedidos por el Departament de Salut y distribuidos por la XCHsF) y un aplicativo telemático para el seguimiento y control de casos.

2.7. Justificación

Diversos estudios internacionales han demostrado como las políticas de espacios sin humo en los hospitales gozan de un elevado cumplimiento y apoyo entres sus usuarios y trabajadores (110-113). Así mismo, han detectado como estas medidas provocan cambios en el consumo de tabaco con la disminución del número de cigarrillos y el aumento del número de intentos de abandono (78,113,114). Estos estudios muestran experiencias piloto positivas en hospitales aislados. Sin embargo, la experiencia de la JCAHO ha demostrado que iniciativas coordinadas para promover el avance de políticas internas consiguen que los hospitales ofrezcan mayor número de intervenciones dirigidas a la prevención y la cesación del tabaco (77).

En Cataluña, la Red Catalana de Hospitales sin Humo, ha desarrollado desde el año 2000 diferentes iniciativas con el fin de fomentar la implantación de actividades de control del tabaco en los hospitales catalanes. Además, en enero de 2006 entró en vigor la Ley 28/2005 de medidas sanitarias frente al tabaquismo, que refuerza la normativa ya existente de prohibición de consumo de tabaco en los centros sanitarios. Sin embargo, se desconocía el impacto que las diferentes medidas de control de tabaquismo tienen en los hospitales catalanes.

Por estos motivos, la Unidad de Control del Tabaquisme del ICO, encargada a la sazón de la coordinación de la XCHsF, se propuso realizar una serie de estudios que evaluaran y midieran el impacto de la implementación de las políticas de control de tabaquismo en los hospitales sin humo de la XCHsF y la exposición al HAT en los hospitales europeos.

2.8 Marco teórico de la investigación

Para el diseño de estos estudios se han tenido en cuenta ciertas consideraciones teórico-metodológicas.

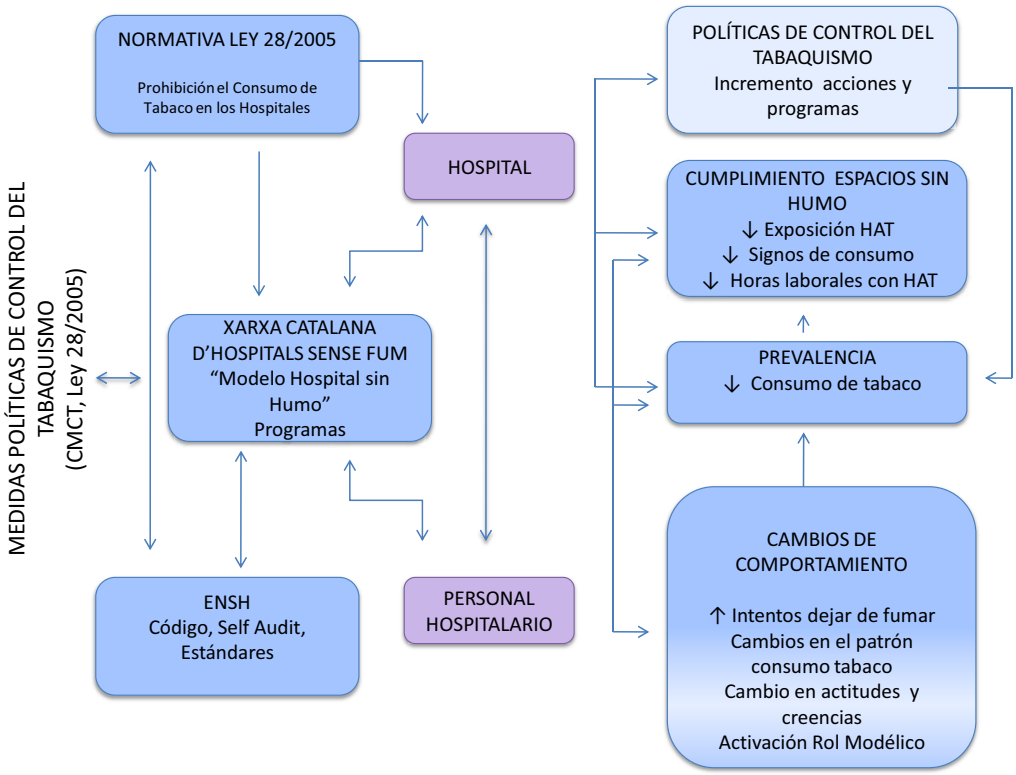
Así se ha asumido la coexistencia y complementariedad de varias las ciencias que pueden evaluar el impacto de las políticas de control del tabaquismo- entre ellas destacan las ciencias de la conducta, las ciencias políticas, la epidemiología, la sociología y la estadística- y se han utilizado métodos epidemiológicos para diseñar los estudios que forman esta tesis doctoral. Se han realizado cinco estudios observacionales (tres estudios transversales, un estudio evaluativo antes y después, y un estudio de seguimiento) con el fin de describir el impacto de las políticas de control del tabaquismo en los hospitales generadas por la Red Catalana de Hospitales sin Humo -que coordina el proyecto "Hospital sin Humo" de acuerdo al modelo propuesto por la ENSH-, y por la Ley 28/2005 de medidas sanitarias para el control de tabaquismo.

En cuanto al marco teórico se ha tomado como referencia la Teoría de Determinantes de Salud de Whitehead y Dahlgen en la que el contexto social y las políticas globales son generadoras de salud (115,116). Así mismo se ha seguido la Teoría de la Difusión de las Innovaciones (117) aplicada a las Organizaciones de Servicios (118). Como propone Greenhalgh et al. se supone que los cambios en las organizaciones se realizan con respecto a cuatro elementos: (1) las características del cambio y los adoptantes, (2) los aspectos de la comunicación y su influencia y características de las organizaciones (contexto interno), (3) el medio y el proceso de implementación y (4) el rol de las agencias externas (o contexto externo).

El modelo explicativo, representado de forma gráfica en la figura 2, plantea los estudios de esta tesis que pretenden discernir:

- Cómo la política progresiva de espacios sin humo ha afectado en el consumo y comportamiento del tabaco en los trabajadores de un hospital.
- Cómo la Ley 28/2005 ha afectado en la progresión de las políticas de control de tabaquismo en los hospitales miembros a la XCHsF y cuál ha sido su impacto en la exposición al HAT.
- Cuáles son los niveles de HAT de diversos hospitales europeos que han implantado el modelo de hospital sin humo de la ENSH y que cuentan con políticas nacionales distintas.
- Y por último, cuál es la efectividad de programas de cesación tabáquica dirigido a trabajadores fumadores de los hospitales.

Figura 2: Modelo Explicativo de la investigación de la tesis doctoral



3. Hipótesis y objetivos

3.1. Hipótesis

En este apartado se presentan las cinco hipótesis fundamentales de la tesis, cada una de las cuales corresponde a los cinco artículos que forman el núcleo central de la misma.

1. La política de espacios sin humo en los hospitales reduce la prevalencia de consumo de tabaco entre los trabajadores, produce cambios en su actitud y comportamiento y aumenta además el compromiso y acuerdo con las políticas de control del tabaquismo.

2. Existe una relación entre la progresión de las medidas de control de tabaquismo en los hospitales adscritos a la XCHsF y la entrada en vigor de la Ley 28/2005.

3. Existe una relación entre la entrada en vigor de la Ley 28/2005 y la disminución del humo ambiental del tabaco (HAT) en los hospitales de Cataluña.

4. Los hospitales europeos que han implementado medidas de control de tabaquismo basándose en el código y estándares de la ENSH presentan niveles bajos de HAT en distintas áreas de hospitalización.

5. El programa de cesación tabáquica dirigido a los trabajadores fumadores de los hospitales miembros de la XCHsF consigue una alta probabilidad de abandono y un bajo riesgo de recaída a los seis meses.

3.2. Objetivos

Objetivo general

Evaluar el impacto de los programas e iniciativas de la Red Catalana de Hospitales sin Humo en las políticas de control del tabaquismo de los hospitales catalanes.

Objetivos específicos

1. Describir los efectos que la política de implantación progresiva de espacios sin humo ejerce en los trabajadores de un centro hospitalario, mediante el examen de los cambios sucedidos en el patrón de consumo, la actitud y comportamiento sobre fumar y el acuerdo con las políticas de control del tabaco tras 6 años de desarrollo del proyecto.

2. Caracterizar la progresión e impacto de las políticas de control de tabaquismo en los hospitales miembros de XCHsF antes y después de la implantación de la Ley 28/2005 de medidas sanitarias frente al tabaquismo.

3. Evaluar el impacto de la Ley de control de tabaquismo 28/2005 en la exposición al HAT en los hospitales públicos catalanes.

4. Describir los niveles de HAT en una muestra de hospitales europeos durante el año 2007.

5. Evaluar la efectividad de un programa de cesación tabáquica coordinado por la XCHsF dirigido a los trabajadores fumadores.

4. Objetivos y resultados de los artículos

4.Objetivos y resultados de los artículos

El presente trabajo de tesis doctoral está constituido por cuatro artículos originales y un manuscrito enviado a publicar que evalúan la implantación e impacto de las políticas para el control del tabaquismo en los hospitales. Los artículos y el manuscrito enviado a publicar de la tesis son:

1. **Artículo Original 1:** Martínez C, García M, Méndez E, Peris M, Fernández E. Barriers and challenges for tobacco control in a Smoke-free Hospital. Cancer Nurs. 2008; 31(2):88-94.
   La revista Cancer Nursing está incluida en los Journal Citation Reports de ISI-Web of Knowledge con un factor de impacto en 2009 de 1,878 (posición 5/72 en la categoría Nursing de la Science Edition).

2. **Artículo Original 2:** Martínez C, Fu M, Martínez-Sánchez JM, Ballbè M, Puig M, García M, Carabasa E, Saltó E, Fernández E. Tobacco control policies in hospitals before and after the implementation of a national smoking ban in Catalonia, Spain. BMC Public Health. 2009; 28(9):160-166.
   La revista BMC Public Health está incluida en los Journal Citation Reports de ISI-Web of Knowledge con un factor de impacto en 2009 de 2,223 (posición 44/122 en la categoría Public, Environmental, and Occupational Health de la Science Edition).

3. **Artículo Original 3**: Fernández E, Fu M, Martínez C, Saltó E, Martínez JM. Secondhand smoke in hospitals before and after a ban on smoking in Catalonia (Spain). Prev Med. 2009; 47(6) 624-628.
   La revista Preventive Medicine está incluida en los Journal Citation Reports de ISI-Web of Knowledge con un factor de impacto en 2009 de 3,172 (posición 21/122 en la categoría Public, Environmental and Occupational Heatlh de la Science Edition).

4-Artículo Original 4: Fernández E, Martínez C, Fu M, Martínez-Sánchez JM, López MJ, Invernizzi G, Ouranou A, Dautzenberg B, Nebot M. Second-hand smoke exposure in a sample of European hospitals (2007). Eur Respir J. 2009; 34(1):111-6.

La revista European Respiratory Journal está incluida en los Journal Citation Reports de ISI-Web of Knowledge con un factor de impacto en 2009 de 5,527 (posición 4/43 en la categoría Respiratory System de la Science Edition).

5- Artículo Original 5: Martínez C, Martínez-Sánchez JM, Ballbè M, Fu M, Puig M, Carabasa E, Sánchez-García JM, Saltó E, Fernández M, & the Tobacco Cessation Program project coordinators. Effectiveness of a coordinated smoking cessation program addressed to hospital workers. Am J Manag Care. [Enviado].

La revista American Journal of Management Care está incluida en los Journal Citation Reports de ISI-Web of Knowledge con un factor de impacto en 2009 de 2,737 (posición 10/69 en la categoría Health Care Sciences and Servicies de la Science Edition).

También se adjunta como anexo la correspondencia mantenida con los Editores de las revistas hasta la aceptación de los artículos. Asimismo, se adjuntan como anexos 2 artículos adicionales fruto del trabajo de la doctoranda en la misma línea de investigación, siendo estos: un artículo original de análisis teórico y una editorial.

En los artículos que forman el núcleo de la tesis se describen con detalle la metodología empleada en cada uno de ellos. En este capítulo se presenta un breve resumen de los resultados más relevantes de los cinco artículos que conforman esta tesis doctoral.

Artículo 1: Barriers and challenges for tobacco control in a Smoke-free Hospital. Cancer Nurs. 2008; 31(2):88-94.

El objetivo de este artículo fue describir los efectos que la política de implantación progresiva de espacios sin humo en los trabajadores de un centro hospitalario tras 6 años de desarrollo del proyecto. Para ello se examinó los cambios sucedidos en el patrón de consumo, la actitud y comportamiento sobre fumar y el acuerdo con las políticas de control del tabaco de los trabajadores.

Resumen de resultados

La prevalencia de consumo de tabaco disminuyó del 34,5% en el 2001 al 30,6% en el 2006 entre los trabajadores. La disminución afectó a todos los grupos profesionales menos al grupo de otros profesionales que se mantuvo estable con una prevalencia del 35,7% en el año 2006. Entre los médicos la prevalencia descendió del 20,0% al 15,2%, entre las enfermeras del 34,0% al 32,6%, y entre los administrativos del 56,0% al 37,0%. Se produjeron cambios en el patrón de consumo del personal fumador, con un aumento del número de fumadores consumidores de <10 cigarrillos al día y > de 20 cigarrillos al día. En relación al primer cigarrillo del día, no se observaron cambios en los seis años de implementación del proyecto "Hospital sin Humo", con un 73% de fumadores que continuaban consumiendo su primer cigarrillo pasados 30 minutos de despertarse. Sin embargo, el número de fumadores abstinentes de fumar en el hospital aumentó significativamente de 12,3% (IC 95%: 4,31-20,2) en 2001 a 44,1% (IC 95%: 31,4-56,7) en 2006. Con respecto a los intentos previos para dejar de fumar, en el 2006 alrededor del 60% de los fumadores

manifestaron haber hecho al menos un intento, además la proporción de aquellos que lo habían intentado en más ocasiones había descendido respecto al 2001. No obstante, el porcentaje de fumadores preparados para iniciar un plan de abandono en el 2006 se mantuvo estable al de años anteriores, situándose alrededor del 43%.

La preocupación de los efectos dañinos del tabaco entre los fumadores se ha mantenido estable. En cambio la exposición al HAT ha descendido significativamente. El porcentaje de trabajadores que están en zonas completamente libres del humo del tabaco durante su jornada laboral ha aumentado del 33,0% (IC 95%: 26,2-39,7) en 2001 al 91,4% (IC 95%: 87,3-94,6) en el 2006.

Por último, aumenta el número de trabajadores que están de acuerdo con la implantación de medidas de control del tabaco en lugares públicos, hospitales y centros de salud. Así, aquellos que creen que fumar debe ser prohibido en el hospital aumentó del 69,9% (IC 95%: 62,3-75,7) en 2001 al 81,8% (IC 95%: 76,0-86,8) en 2006. Sin embargo, no se produjo un cambio en el porcentaje de trabajadores que opinaron estar de acuerdo con la afirmación: "los profesionales de la salud deben ser un ejemplo y no fumar". A pesar de ello, en 2006 la opinión fue más favorable entre los no fumadores (60,3%) y nunca fumadores (57,9%) que entre los fumadores activos (33,9%).

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Artículo 2: Tobacco control policies in hospitals before and after the implementation of a national smoking ban in Catalonia, Spain. BMC Public Health. 2009; 28(9):160-166.

El objetivo de este artículo fue caracterizar la progresión e impacto de las políticas de control de tabaquismo en los hospitales miembros de XCHsF antes y después de la implantación de la Ley 28/2005 de medidas sanitarias frente al tabaquismo mediante el uso del cuestionario self-audit de autoevaluación de las políticas de control del tabaco.

Resumen de resultados

La puntuación media de la implementación de las políticas de control del tabaco en los hospitales fue de 52,4 (IC 95%: 45,4-59,5) en el 2005 y 71,6 (IC 95%: 67,0-76,2) en el 2007. Los datos evidencian un incremento del 36,7% ($p<0,01$) en las políticas de control de tabaco en los hospitales de la XCHsF tras la puesta en marcha de la Ley 28/2005. Los hospitales con mayor incremento fueron los hospitales generales (incremento del 48%, $p<0,01$), hospitales con >300 camas (incremento del 41,1%, $p<0,01$), hospitales cuyos trabajadores presentaban una prevalencia de consumo de tabaco entre 35-39% (incremento del 72,2%, $p<0,05$), hospitales con <4 años en la red (incremento de 74,2%. $p<0,01$).

La puntuación media de las todas políticas que configuran los 10 estándares incluidos en el cuestionario self-audit aumentó después de la puesta en marcha de la Ley. Entre los estándares con mayor incremento destacó "lugares saludables" con un amento del 78,3% ($p<0,01$) y "promoción de la salud" con un incremento del 57,1% ($p<0,05$). Sin embargo, los estándares con menor crecimiento fueron "control del tabaco" y "ambiente" al ser estos los que habían conseguido puntuaciones más altas en el 2005 y tenían menos margen de crecimiento. Entre los estándares susceptibles a mejorar destacan "identificación y apoyo en la cesación" (con 12,8 puntos de un máximo de 24) y "educación y formación" (con 7,1 puntos de un máximo de 12).

Artículo 3: Secondhand smoke in hospitals before and after a ban on smoking in Catalonia (Spain). Prev Med.2009; 47(6):624-8.

El objetivo de este artículo fue evaluar el impacto de la Ley 28/2005 en la exposición al HAT en los hospitales públicos catalanes.

Resumen de resultados

La concentración mediana de nicotina disminuyó de 0,23 μg/m^3 (rango intercuartil (RIQ): 0,13-0,63) antes de la Ley, a 0,10 μg/m^3 (rango intercuartil: 0,02-0,19) después de la Ley, lo que supuso una disminución del 56,5% ($p<0,01$). Antes de la implantación de la Ley las concentraciones medianas tomadas fueron superiores en las cafeterías (0,62 μg/m^3 RIQ: 0,23-3,43), seguido de las escaleras de incendios (0,31 μg/m^3 RIQ: 0,14-0,87). Tras la Ley se observó reducciones significativas en la concentración mediana de nicotina en todas las localizaciones. Los mayores cambios en la concentración de nicotina se produjeron en la zona de vestuario de las áreas quirúrgicas (disminución del 97,8%), en las unidades de hospitalización de cirugía (disminución del 83,3%) y en las cafeterías (disminución del 83,9%). En algunos hospitales, fumar estaba permitido en las cafeterías antes de la implantación de la Ley con zonas designadas para fumadores o con ningún tipo de limitación. La concentración mediana de nicotina en las cafeterías donde se permitía fumar en lugares designados fue de 3,67 μg/m^3 (RIQ: 3,04-6,25) antes de la Ley y de 0,25 μg/m^3 (RIQ: 0,03-0,42) un año después, con una disminución significativa del 93,3% ($p<0,05$). Por otro lado, la concentración de nicotina basal en las cafeterías que permitían fumar antes de la Ley fue 3,61 μg/m^3 (RIQ: 0,82-11,48) y de 0,11 μg/m^3 (RIQ: 0,05-0,19) después de la aplicación de la misma, con una disminución del 97,0%. Además, un año después de su puesta en vigor se continuaron detectando valores de HAT en las entradas de los hospitales, sala de urgencias, escaleras de incendios y cafeterías aunque sus concentraciones eran más bajas (entre un rango de 0,10 a 0,16) que antes de la Ley (rango entre 0,19 a 0,62).

Artículo 4: Second-hand smoke exposure in a sample of European hospitals (2007). Eur Respir J. 2009; 34(1):111-116.

El objetivo de este artículo es describir los niveles de HAT en una muestra de hospitales europeos durante el año 2007.

Resumen de resultados

La mediana de concentraciones de $PM_{2.5}$ en todos los países y localizaciones fue de 3,0 $\mu g/m^3$. No se presentan grandes variaciones entre los 7 países estudiados a excepción de Grecia (4,0 $\mu g/m^3$), España (5,0 $\mu g/m^3$) y Rumania (10,0 $\mu g/m^3$), que presentaban valores medianos más altos.

Por localización, la mediana de concentraciones de $PM_{2.5}$ en todos los países se situó entre 2,0 $\mu g/m^3$ (unidades de hospitalización quirúrgica) y 4,0 $\mu g/m^3$ (unidades de hospitalización de medicina interna). La mitad de las medidas obtenidas estaban en un rango entre 2,0 a 8,0 $\mu g/m^3$. Los lugares con mayor concentración de $PM_{2.5}$ fueron halls, salas de espera de emergencias, unidades de hospitalización de medicina interna, cafeterías y escaleras de incendios. Además, once medidas (5,5%) estaban por encima de 25,0 $\mu g/m^3$, límite recomendado por la OMS para los espacios exteriores. Estas medidas correspondían a cafeterías, lugares de fumadores y otras zonas del hospital de hospitales de Grecia, Bélgica y Rumania, respectivamente.

Artículo 5: Effectiveness of a coordinated smoking cessation program addressed to hospital workers. Am J Manag Care. [Enviado].

El objetivo de este artículo es evaluar la efectividad de un programa de cesación tabáquica (llamado PDT) en términos de abstinencia dirigido a los trabajadores fumadores de 33 hospitales de la XCHsF en Cataluña.

Resumen de resultados

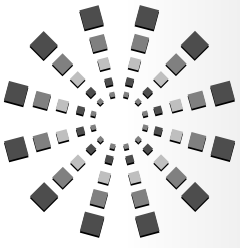
Se incluyeron 1087 trabajadores fumadores en el programa PDT en los 33 hospitales participantes de julio del 2005 a diciembre del 2007. De ellos, 157 (14,4%) se excluyeron para el análisis al no incluir el día "D" o día de dejar de fumar. Así, se analizaron finalmente 930 personas. El 71,3% eran mujeres, estando igualmente distribuidos por grupos de edad. Por profesión el 28,1% eran enfermeras, el 10,2% eran médicos, el 15,4% administrativos y 46,3% otros profesionales. La mayoría de los trabajadores eran grandes fumadores: el 64,0% fumaba ≥ 20 cigarrillos por día y el 46,2% llevaban ≥ 25 años fumando. Además, el 26,9% presentaba una alta dependencia a la nicotina.

La probabilidad de abstinencia global a los 6 meses fue de 0,504 (IC 95%: 0,431-0,570). Los hombres obtuvieron mejor abstinencia 0,526 (IC 95%: 0,398-0,651) que las mujeres (0,495, IC 95%: 0,410-0,581). Por grupos profesionales, los médicos obtuvieron una abstinencia más alta (0,659, IC 95%: 0,506-0,811) que las enfermeras (0,463, IC 95%: 0,349-0,576). Los trabajadores con mayor dependencia a la nicotina (Test de Fagerström > 7) tuvieron una menor probabilidad de abstinencia (0,376, IC 95%: 0,256-0,495) que los trabajadores con baja dependencia (Test de Fagerström ≤ 6) (0,529, IC 95%: 0,458-0,599). Se observa una alta probabilidad de abstinencia en trabajadores tratados con terapia farmacológica combinada (0,761, IC 95%: 0,588-0,933).

5. Artículos

5.1. Artículo 1

Martínez C, García M, Méndez E, Peris M, Fernández E. Barriers and challenges for tobacco control in a Smoke-free Hospital. Cancer Nurs. 2008; 31(2):88-94.



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Barriers and Challenges for Tobacco Control in a Smoke-Free Hospital

KEY WORDS
Healthcare professionals
Hospitals
Policies
Smoking cessation
Tobacco

The study aimed to identify the extent of smoking, compliance with tobacco restrictions, and attitudes toward smoking and tobacco control measures among the employees in a Comprehensive Cancer Center from 2001 to 2006 where a smoke-free policy was progressively introduced. Four cross-sectional surveys were conducted from 2001 to 2006. Survey items include smoking status, smoking history, environmental tobacco exposure, and agreement with tobacco initiatives. The prevalence of smoking has declined from 34.5% in 2001 to 30.6% in 2006. The decrease was present in all professional groups: Doctors from 20.0% in 2001 to 15.2% in 2006 and administrative clerks from 56.0% in 2001 to 37.0% in 2006 reduced the most. Among nurses, the prevalence of smoking was still high with a 2-point percent reduction (from 34.0% in 2004 to 32.6% in 2006). Other changes of the pattern of smoking were apparent: a reduction on the number of cigarettes smoked, decrease of daily smokers, and increase of smoking abstinence during the hospital duty. Compliance with smoke-free areas increased. We observed a very significant decrease of the perception of exposure to environmental tobacco exposure at work. The Smoke Free project helped to achieve a healthy work environment. Tailored smoking cessation programs should be designed to help healthcare professionals to stop smoking. In addition, healthcare professionals should play a key role in promoting a healthy smoke-free lifestyle.

Surveys of healthcare providers are recommended as the base for tobacco control initiatives.[1] The health community plays a key role in the global effort to fight this epidemic. Health professionals should be an example in tobacco control initiatives. Still, in some countries, prevalence among health professionals is similar to the average of the population. Smoking health professionals are less likely to intervene and to deter their patients from smoking.[2] Thus, they are among the first targets for tobacco control.[3,4]

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One of the most effective strategies to reduce the harm from smoking and prevent cancer is introducing "smoke-free environment" policies.[5–7] Because in most developed countries, adults spend a considerable amount of hours in the workplace, which may have an effect on their smoking behavior.[8–11] This strategy, suggested by the World Health Organization, has proliferated with reasonable success in several countries that have recently launched smoking bans in workplaces, hospitals, and other public areas.[12–15] Smoke-free policies have had a significant impact in the attitudes and behaviors of the smokers such as discouraging smoking, reducing cigarette consumption, and increasing the desire to quit and the likelihood of cessation.[13]

After the ratification of the Framework Convention on Tobacco Control on January 27, 2005, a new law for Prevention and Control of Smoking has been implanted in Spain. Restrictions in selling, advertising, and using tobacco in public places, workplaces and hospitals have been established.[14]

Hospitals should be an example in terms of controlling tobacco consumption and championing compliance with the law.[15] Furthermore, health services should take the lead in implementing smoke-free policies, which promote adequate environments for patients, visitors, and employees. In addition, hospitals should ensure that patients and employees are provided with information and advice about the dangers of smoking and cessation therapies.[16] In Spain, 30.0% of the population smokes. By gender, 35.8% of men and 24.3% of women are smokers.[17] In the case of health professionals, among physicians, the rates have decreased in the last decades and are lower than the general population, whereas among nurses, it is still higher, with 35.1% of them being smokers.[3]

The Catalan Institute of Oncology (ICO), a Comprehensive Cancer Center in Barcelona, Spain, began the implementation of the "smoke-free" policy in 1997. Before the official launching, ICO gradually developed a smoke-free policy plan whose main element was to facilitate an organizational change.[18] During the last 9 years, the smoke-free ICO project has been evaluated through tools such as the smoking prevalence survey, self-audit questionnaires, and observational inspections, and the smoke-free hospital model has been extended to most public hospitals over the country in the framework of the Catalan Network for Smoke-free Hospitals.[19]

This study reports the effects of the implementation of a progressive Smoke Free Hospital Policy at the ICO. Data from 4 cross-sectionals surveys (from 2001 to 2006) are used to examine the smoking status of hospital employees, the changes in their attitudes and behaviors about smoking, and the commitment toward smoking policy.

■ Methods

Design, Procedure, and Sample

Data were obtained from 4 cross-sectional surveys conducted in 2001, 2002, 2004, and 2006 among a representative sample of the employees of the ICO. The sample sizes were estimated taking into account the smoking prevalence among healthcare professionals in Catalonia in 1998 (35%) and assuming a 95% confidence level and an error ±4. They were calculated using Statcalc in EpiInfo, version 6.0.4 (Centers for Disease Control and Prevention, Atlanta, Georgia). We gathered information from 188 participants in 2001, 184 in 2002, 234 in 2004, and 237 in 2006 interviewed face-to-face by trained interviewers. Because not all the selected participants were present at work during the days of the interviews, the interviewers tried to locate each participant a maximum of 4 times at their work post. If they were not located, we randomized other participant of the same age and sex group. This survey was run under the approval of the institutional board.

Questionnaire and Variables

A confidential and common questionnaire for all the hospitals members of the European Network of Smoke-Free Hospitals was used. This questionnaire was developed by experts' working group from the European Network of Smoke-Free Hospitals and piloted in smoke-free hospitals in 6 countries: Belgium, France, Greece, Spain, Ireland, and Romania. No formal assessment of its psychometric properties has been carried out to date, but its feasibility has been tested.[20] The questionnaires in 2001 and 2002 were identical. The 2004 and 2006 questionnaires were shorter but maintained the core questions: social and demographic data, profession, smoking status (that in the second version incorporates daily smokers and occasional smokers), attitudes toward active and passive smoking, and exposure to environmental tobacco exposure (ETS) during working time. In addition, the questionnaire included employee's agreement or disagreement toward different statements about tobacco control policies and smoking restrictions.

The survey assessed *current tobacco consumption status* as smokers either daily (at least 1 cigarette/d) or occasional smokers (<1 cigarette/d), former smokers, and never smokers. For those who were current smokers, we collected additional information such as the number of cigarettes smoked per day, years of tobacco consumption, previous attempts to quit and willing of quitting smoking, and concern about harmful effects of tobacco. For former smokers, we gathered information about the number of cigarettes smoked, smoking duration, and the number of serious attempts made to quit.

Compliance with the tobacco-free policy was evaluated by asking the employees if they smoked in 12 selected areas of the hospital such as nursing rest areas, cafeteria, offices, and lifts. In addition, *exposure to ETS* was estimated by requesting the number of hours exposed during their hospital duty.

Finally, we collected information regarding support for smoking bans in public places and tobacco control policies, as well as their agreement with some exemplary professions (healthcare providers and teachers) as role models.

Statistical Analysis

The prevalence (%) of smokers (daily and occasional), former smokers, and never smokers and 95% confidence interval

(CI) were computed. We study the tobacco dependence among smokers. In addition, we computed the proportion of participants according to their response to the other study variables such as exposure to environment tobacco smoke, attitudes toward smoking, and agreement with smoke-free policies. All procedures were implemented using the Statistical Package for Social Sciences, 11.0.

■ Results

Sociodemographic Data

During the study period, there was no difference in the distribution of the sample. Around 75% of our responders were women. The distribution of the 4 professional groups across this time has not changed. Thus, in 2006, 17.3% were doctors, 46.6% were nurses, 14.1% were administrative employees, and 22.0% were other professionals (ie, statisticians, technical assistants, informatics, and so on). Overall, hospital employees were young (75% aged 25 to 44 years).

Smoking Consumption

Smoking prevalence has slightly decreased from 34.5% (95% CI: 27.7–41-2) in 2001 to 30.6% (95% CI: 24.7–36.4) in 2006 (Table 1). A similar reduction in the prevalence of smoking was observed among women (from 34.3% in 2001 to 31.9% in 2006) and men (from 35.4% in 2001 to 27.7% in 2006). Regarding smoking consumption within employee's groups, there was a decrease in the number of smokers in all the groups. The prevalence of smokers among health employees decreased from 30.2% in 2001 to 27.8% in 2006. Smoking prevalence among doctors reduced from 20.0% in 2001 to 15.2% in 2006, and among nurses, it decreased from 34.0% to 32.6%, respectively.

Tobacco Smoking Dependence

We observed a general high smoking dependence in the 3 first surveys: with 60% of smokers consumed between 10 and 20 cigarettes per day. This pattern of consumption changed in 2006, with an increase of both those who smoked <10 cigarettes per day and those who smoked >20 cigarettes per day. In regard to the first cigarette of the day, there has been steady tendency, and around 73% of our employees smoked the first cigarette after 30 minutes of been awake (Table 2).

Attempts to Quit Smoking

In relation to the will of quitting, no substantial changes have occurred in the last 5 years. Around 60% of smokers have attempted to quit at least once, and the proportion of those who have tried more than once has decreased from 2001 (Table 2). Forty-three percent of smokers expressed their readiness to plan to quit in 2006, similar to the proportion observed in the previous surveys.

Concern of the Harmful Effects of Tobacco Consumption

Smokers' concerns on the harmful effects of tobacco have been steadily high during the last 5 years. Around 65% of smokers in 2006 were worried about their own health. Similar results about the concern of tobacco effects in nonsmokers who were in contact with tobacco smoke have been obtained. In 2006, about 64% of smokers expressed concern about the effects of their smoking consumption on others' health.

Exposure to ETS

Exposure to ETS has decreased in the last 5 years (Table 3). The percentage of employees working in a smoke-free environment has increased from 33.0% (95% CI: 26.2–39.7) in 2001 to 91.4% (95% CI: 87.3–94.6) in 2006. Compliance to ICO's smoke-free areas has increased across the study period. In 2001, few smokers affirmed to have smoked inside the nursing rooms, but in 2006, no interviewed declared so. Similarly, and since 2004, no employees interviewed affirmed to have smoked in the smoke-free

Table 1 • Tobacco Consumption, 2001–2006

	2001 (n = 188)		2002 (n = 186)		2004 (n = 206)		2006 (n = 237)	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Tobacco consumption status at ICO hospital								
Smokers[a]	34.5	(27.7–41.2)	32.8	(26.1–39.5)	34.0	(27.5–40.4)	30.6	(24.7–36.4)
Never smokers	38.3	(31.3–45.2)	44.6	(37.4–51.7)	37.9	(31.2–44.5)	39.4	(33.1–45.6)
Former smokers	27.1	(20.7–33.4)	22.6	(16.5–28.6)	28.2	(22.1–34.3)	30.1	(24.2–35.9)
Smoking prevalence by profession								
Doctors	20.0	(6.7–33.2)	24.3	(10.4–38.1)	17.2	(3.4–30.9)	15.2	(2.9–27.4)
Nurses	34.0	(24.4–43.5)	32.3	(22.8–41.8)	30.0	(19.3–40.7)	32.6	(22.8–42.3)
Administrative employees	56.0	(36.5–75.4)	46.7	(28.8–64.5)	31.3	(15.2–47.3)	37.0	(18.7–55.2)
Other	35.3	(19.1–51.2)	30.7	(12.9–48.4)	47.8	(36.2–59.3)	35.7	(21.2–50.2)

Abbreviations: CI, confidence interval; ICO, Catalan Institute of Oncology.
[a]Include daily and occasional smokers.

Table 2 • Tobacco Dependence Among Smokers From 2001 to 2006

	2001 (n = 188)		2002 (n = 186)		2004 (n = 206)		2006 (n = 237)	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Tobacco dependence								
Daily cigarettes								
<10 cigarettes	30.8	24.8–51.19	28.3	15.9–40.1	25.0	14.0–35.9	48.8	35.3–60.7
10–20 cigarettes	61.5	47.7–74.3	62.3	48.8–75.2	68.3	56.2–79.8	37.2	24.6–49.3
>20 cigarettes	7.7	0.7–13.2	9.4	2.2–12.8	6.7	0.3–13.1	14.0	5.1–22.8
First cigarette								
<5 min	6.2	0.2–11.7	5.0	0.4–10.1	10.0	2.9–17.0	5.3	0–11.0
5–30 min	16.9	7.0–26.1	20.0	9.9–30.1	21.4	11.4–30.6	18.6	8.5–28.5
>30 min	76.9	66.7–87.2	75.0	64.1–85.6	68.6	57.1–78.9	72.9	60.5–83.4
Attempts to quit smoking								
Yes	64.6	52.0–76.0	56.7	44.0–69.0	58.6	47.0–70.0	58.6	55.4–61.8
Number of attempts to quit smoking								
1	41.5	29.0–10.53	40.0	27.7–52.3	45.7	34.1–57.4	54.5	41.8–67.2
2–3	41.5	29.0–53.0	51.4	38.8–63.9	41.4	29.8–52.9	36.3	24.0–48.5
>3	17.1	7.9–26.2	8.6	1.5–15.6	12.9	5.1–20.7	9.2	1.7–16.3
Readiness to quit smoking								
Yes	40.3	28.4–52.2	41.7	29.4–54.1	32.4	21.4–44.4	42.4	29.8–55.0

Abbreviation: CI, confidence interval.

cafeteria and the employees' rest areas. The number of those who abstained from smoking during their working time has significantly increased since 2001. As a result, abstainers passed from 12.3% (95% CI: 4.31–20.2) in 2001 to 44.1% (95% CI: 31.4–56.7) in 2006.

Attitudes Toward Smoking and Tobacco Control Measures

Employees' agreement toward the smoking ban in close public areas, hospitals, and health centers was high (Table 4). Indeed, those who think that smoking should be forbidden in hospitals have increased from 69.9% (95% CI: 62.3–75.7) in 2001 to 81.8% (95% CI: 76.0–86.8) in 2006. Most of the employees agreed that health professionals should give example to others as regards tobacco consumption. However, there has not been a positive change in the percentage of responders who agreed that health professions should give example. Finally, employees' opinions on smoking policies have remained similar during the 5 years. Most of our employees considered that tobacco advertising should be forbidden, but the proportion aiming at tobacco tax increases was lower. As also seen in Table 4, the percentage of agreement with the smoke-free policies was systematically higher among never and former smokers.

■ Discussion

Surveys in our hospital have shown a reduction in overall prevalence of smoking, changes in pattern of consumption, and higher support on tobacco policies. Moreover, the compliance of smoke-free areas has improved during the study period and the percentage of employees not exposed to ETS during their working shift has substantially increased. Some studies indicate that the more restrictive the bans have been implemented, the greater effects on smoking behavior at the workplace.[8,21]

The Catalan Institute of Oncology has introduced progressive policy bans on tobacco consumption.[17] First, a tobacco control committee was established in 1997, and the hospital was declared smoke-free in 1998 (although 3 smoking rooms were maintained). In 2001, we started educational and training courses of tobacco control addressed to nurses with the aim of

Table 3 • Exposure to Environmental Tobacco Smoke in the Workplace

	2001 (n = 188)		2002 (n = 186)		2004 (n = 206)		2006 (n = 237)	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
None	33.0	(26.3–39.7)	31.2	(24.5–37.8)	55.3	(48.4–62.2)	91.4	(87.3–94.6)
<1 h	46.3	(39.1–53.4)	47.3	(40.1–54.5)	38.6	(31.8–45.4)	5.3	(2.4–8.1)
1–4 h	18.1	(12.6–23.6)	17.2	(1.86–22.7)	5.5	(2.3–8.8)	1	(0–2.2)
>4 h	2.1	(0.5–4.14)	4.3	(1.38–7.21)	0.5	(0.5–1.4)	0	—

Abbreviation: CI, confidence interval.

Table 4 • Agreement With Smoke-Free Policies and Ban Limitations

	2001		2002		2004		2006	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Smoking should be forbidden in public areas.								
Overall	81.1	(75.2–86.7)	78.9	(71.8–84.1)	80.5	(80.0–89.9)	83.8	(78.1–87.8)
Smokers	69.4	(57.5–80.5)	55.6	(42.3–68.8)	67.7	(56.3–79.1)	80.7	(70.5–90.5)
Never smokers	89.9	(82.8–97.0)	92.5	(87.4–98.6)	92.2	(86.2–98.1)	85.5	(77.6–93.4)
Former smokers	83.7	(73.3–94.0)	82.9	(72.6–95.1)	79.3	(68.9–84.7)	84.5	(75.2–93.8)
Smoking should be forbidden in hospitals and health centers.								
Overall	69.9	(62.3–75.7)	70.9	(63.2–76.7)	71.5	(64.7–77.2)	81.8	(76.0–86.8)
Smokers	57.1	(44.8–69.3)	59.9	(46.8–73.4)	60.6	(48.8–72.4)	74.1	(62.8–85.5)
Never smokers	81.4	(72.2–90.5)	82.2	(77.8–90.5)	77.9	(68.6–87.1)	88.2	(80.9–95.4)
Former smokers	70.0	(57.3–82.7)	73.2	(59.6–86.7)	75.4	(64.2–86.8)	81.0	(70.9–91.0)
Hospitals should dispose of smoking areas.								
Overall	88.5	(83.3–92.7)	83.4	(77.4–88.5)	81.3	(75.5–86.6)	61.1	(54.8–67.2)[a]
Smokers	88.7	(80.8–96.5)	90.7	(82.5–98.8)	89.4	(81.9–96.8)	79.7	(69.1–89.9)
Never smokers	90.3	(83.4–97.1)	78.3	(69.4–87.1)	77.6	(68.2–86.9)	50.0	(38.7–61.2)[a]
Former smokers	85.7	(75.9–95.5)	84.2	(72.6–95.7)	76.8	(65.7–87.8)	56.9	(44.1–69.6)[a]
Health professionals should set a good example by not smoking cigarettes.								
Overall	53.0	(45.3–60.7)	44.6	(36.0–51.9)	60.9	(53.8–68.1)	51.8	(45.3–58.3)
Smokers	45.6	(32.6–58.5)	15.6	(4.9–26.2)	35.7	(23.1–48.2)	35.6	(22.3–47.8)
Never smokers	60.0	(47.6–72.4)	61.8	(50.3–73.3)	74.6	(64.4–84.7)	57.9	(46.7–69.0)
Former smokers	53.2	(38.9–67.6)	48.6	(32.0–65.1)	69.2	(56.4–81.5)	60.3	(47.7–72.9)
Teachers should set a good example by not smoking cigarettes.								
Overall	59.0	(51.5–66.5)	49.0	(40.8–57.1)	64.0	(56.8–71.1)	53.4	(54.7–67.2)
Smokers	50.9	(37.9–63.8)	16.7	(5.4–27.9)	38.9	(25.8–51.9)	33.9	(21.8–45.9)
Never smokers	64.5	(52.6–76.4)	64.7	(53.3–76.0)	78.6	(69.3–88.4)	57.9	(46,8–69.0)
Former smokers	61.7	(47.8–75.6)	57.1	(40.7–73.5)	70.6	(58.1–83.1)	67.2	(55.1–79.3)
Tobacco advertisement should be forbidden.								
Overall	80.8	(74.8–86.7)	74.1	(67.3–80.6)	81.7	(76.1–87.2)	70.5	(71.5–85.9)
Smokers	75.4	(64.2–86.5)	69.2	(56.6–81.7)	80.7	(70.4–90.9)	76.3	(65.4–87.1)
Never smokers	86.4	(78.1–94.6)	82.7	(74.1–91.2)	85.3	(77.3–93.3)	68.4	(57.9–78.8)
Former smokers	79.5	(67.5–91.4)	62.9	(46.9–78.9)	77.8	(66.7–88.6)	67.2	(55.1–79.2)
Tobacco taxes should be increased.								
Overall	42.7	(34.7–50.6)	47.2	(39.4–54.9)	59.6	(52.4–66.7)	47.2	(36.9–57.4)
Smokers	21.8	(10.8–32.7)	26.3	(14.8–37.7)	39.7	(27.6–51.8)	19.8	(18.7–42.2)
Never smokers	53.6	(40.5–66.6)	61.1	(49.8–72.3)	73.9	(63.5–84.2)	49.5	(38.2–60.7)
Former smokers	56.4	(40.8–71.9)	53.1	(35.8–70.3)	64.7	(51.8–77.8)	30.8	(18.9–42.6)

Abbreviation: CI, confidence interval.
[a]Statistical significant ($P < 0.005$).

increasing their role in the project. In 2003, we implemented changes in the hospital environment: We allowed only 1 smoking area in the entire center, exclusively for employees. In December 2004, we conducted the third survey of this study, and in July of 2005, the Hospital became entirely smoke-free, anticipating the law on tobacco control in Spain.[14] The project has promoted nonsmoking practices as the normal social pattern in a country where smoking remains a standard and accepted behavior.[18]

In 2006 a complete reduction in the exposure to ETS at the workplace has been achieved. The smoke-free indoor working environment has been maintained, and increased thanks to a continuous process of assessment and support. At the same time, other cultural and social factors have made this change possible.[22] After the approval of the Spanish tobacco control law in December 2005, the agreement to implement tobacco control policies increased, as well as the concern about the harmful effects of tobacco smoke. Moreover, the great majority of employees were in favor of smoking bans in public areas such as hospitals. In fact, support to tobacco control initiatives, such as smoke-free public areas and health centers, has increased over the time in our hospital. Nonetheless, to evaluate more acutely the attitudes, behaviors, and opinions of our employees about the smoke-free hospital project, we are going to use qualitative research methods. This approach might help us to know in detail how smoke-free policies affect individuals in a hospital organization.

As compared with Spanish health professionals, the prevalence of smoking in our hospital is 5 percentage points lower. In the European Region, however, smoking prevalence among physicians is lower[23] (ie, 14% in Sweden and 6.8% in the UK). Among nurses, the prevalence of smoking in Europe is similar to that of the general population (around 25%–30%) and lower than in our hospital.[24] In the United

States, smoking declined most rapidly among physicians, at an intermediate rate among registered nurses, and at a lower rate among licensed practical nurses.[25]

In addition, the consumption pattern among smokers has changed in our hospital. We observe that the number of cigarettes smoked has decreased as well as the percentage of daily smokers, and hence, the percentage of occasionally smokers has increased. Other studies have reported similar consequences at the early stages of smoke-free ban projects.[8,11] Considering that our main achievement is a change in smoking pattern and a steady high percentage of those who wish to quit, further efforts need to be made. It seems clear that a "smoke-free hospital" is an opportunity to encourage smoking cessation among its workers.[26]

To help smokers to quit and be conscious of the particular difficulties that health professionals experience in quitting smoking,[27] we started in 2002 a pilot cessation support program to help smokers to give up through a mentoring tobacco cessation program.[28] Initially, we directed our pilot program to nurses because of their high smoking prevalence and their active role model. Some nursing associations, such as the International Society of Nurses in Cancer Care, enhance nurses as role models in tobacco control. Following their recommendations, we enrolled nurses as an instrumental partner in our project because nurses are the largest health professional group—they have extensive exposure to various populations through direct client contact in a diversity of care settings and, moreover, are trusted by the public. For this reason, our smoke-free project tries to implicate nurses and enhance their responsibilities in the hospital. Therefore, we train nurses in tobacco prevention and cessation care activities that they can perform in their daily work.[29,30] We have tried to implicate nurses and the rest of employees in promoting tobacco cessation using brief counseling and nicotine replacement therapy as effective strategies to help smokers to quit.

There are some limitations of this study to be mentioned. We have used repeated cross-sectional and comparable surveys. Although some selection bias due to selective participation is probable, the confidentiality was assured when approaching the workers.

The use of self-reported smoking status can cause errors in classification in intervention studies of smoking cessation, but it is an adequate form of classifying smokers in observational studies.[31] Furthermore, the questionnaire was interviewer administered, and this methodology has shown higher estimates of sensitivity and specificity than self-administered questionnaires.[32]

Changing a smoking hospital into a smoke-free hospital is a hard but not impossible task and necessitates long-term effort and commitment. We have observed steady reductions in ETS exposure, variations in smoke's attitudes and behaviors, and changes in tobacco consumption patterns progressively when more restrictive bans were applied. However, some challenges need to be faced. Promotion of smoking cessation should be an integral part of our smoke-free policy because one of the major aims of any policy must be to reduce the burden of disease caused by smoking. Moreover, almost 75% of smokers wish to quit, and the decision to embrace a smoke-free policy may propel them to quit.[33] Healthcare professionals have the responsibility to give example, and only after adopting a smoke-free lifestyle can they assume an active role in tobacco control.

Eight years after starting systematic actions aimed to control tobacco in our hospital, we are able to identify the barriers and the challenges for the future. The main barriers recognized are, first, the starting high smoking prevalence rates in our employees (particularly among nurses) and, second, the low awareness of health professionals of being a role model in tobacco control at hospitals. We have also identified some challenges for the future: appropriate training and education in tobacco control activities should be provided to assist staff, efficient cessation support for employees willing to quit should be offered, and smoking cessation programs for hospitalized patients should be provided.

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5.2. Artículo 2

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Research article

Tobacco control policies in hospitals before and after the implementation of a national smoking ban in Catalonia, Spain

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Abstract

Background: Diverse projects and guidelines to assist hospitals towards the attainment of comprehensive smoke-free policies have been developed. In 2006, Spain government passed a new smoking ban that reinforce tobacco control policies and banned completely smoking in hospitals. This study assesses the progression of tobacco control policies in the Catalan Network of Smoke-free Hospitals before and after a comprehensive national smoking ban.

Methods: We used the Self-Audit Questionnaire of the European Network for Smoke-free Hospitals to score the compliance of 9 policy standards (global score = 102). We used two cross-sectional surveys to evaluate tobacco control policies before (2005) and after the implementation of a national smoking ban (2007) in 32 hospitals of Catalonia, Spain. We compared the means of the overall score in 2005 and 2007 according to the type of hospital, the number of beds, the prevalence of tobacco consumption, and the number of years as a smoke-free hospital.

Results: The mean of the implementation score of tobacco control policies was 52.4 (95% CI: 45.4–59.5) in 2005 and 71.6 (95% CI: 67.0–76.2) in 2007 with an increase of 36.7% ($p < 0.01$). The hospitals with greater improvement were general hospitals (48% increase; $p < 0.01$), hospitals with > 300 beds (41.1% increase; $p < 0.01$), hospitals with employees' tobacco consumption prevalence 35–39% (72.2% increase; $p < 0.05$) and hospitals that had recently implemented smoke-free policies (74.2% increase; $p < 0.01$).

Conclusion: The national smoking ban appears to increase tobacco control activities in hospitals combined with other non-bylaw initiatives such as the Smoke-free Hospital Network.

Background

After the approval of the World Health Organization (WHO) Framework Convention on Tobacco Control [1], many countries have introduced smoke-free policies to protect non-smokers from the hazards of secondhand smoke (SHS) [2]. Hospitals should be an example in terms of controlling tobacco consumption and championing compliance with the law [3,4]. Furthermore, health care services should take the lead in implementing smoke-free policies which promote adequate environments for patients, visitors and employees. Current evidence suggests that a comprehensive tobacco policy in hospital settings should include enforcement of indoor smoke-free policies, reducing tobacco consumption among health professionals, encouraging abstinence for patients [5,6], and contributing in health promotion to denormalise tobacco consumption [7].

In 1993, US hospitals became smoke-free in accordance with the Joint Commission on Accreditation of Health Care Organizations [8]. In Europe, the European Network of Smoke-free Hospitals (ENSH) has developed an European Code that sets guidelines for the establishment of smoke-free policies in hospitals since 2000 [9]. Furthermore, the ENSH has developed standards and supportive instruments to assist hospitals' efforts towards the attainment of a comprehensive smoke-free policy [5,10].

The Catalan Network of Smoke-free Hospitals has used the ENSH model to promote smoke-free hospitals in Catalonia, Spain [5]. The national government of Spain passed a new tobacco control law that came into force the first of January 2006 [11]. Smoking was banned in all enclosed public places and workplaces, including health care facilities [12]. Smoking in care centres was already prohibited under both national and regional previous legislation in Catalonia [13], although smoking rooms and smoking areas within the hospitals' cafeterias were allowed. The new law, however, bans completely smoking in all health care facilities without exceptions. After the law, SHS exposure has decreased in Catalan hospitals [14].

This study assesses the progression of tobacco control policies in the Catalan Network of Smoke-free Hospitals before and after a national smoking ban in hospitals that had implemented the ENSH Code and Standards, and hence may contribute to further evaluate the impact of the law.

Methods

We conducted two independent cross-sectional surveys to monitor tobacco control policies in hospitals members of the Catalan Network of Smoke-free Hospitals at consolidation stage. We defined as consolidation stage those hospitals with two or more years of enrollment after the official launching of the project [5] in 2005. From the 43 members of the Network in 2005, 32 (74.4%) satisfied this criterion, and were included in the study. The baseline survey was run in April 2005, six months before implementing the law, and the second one a year and four months after its implementation in April 2007.

The degree of implementation of the Smoke-free Hospitals Project was analysed by means of the Self-Audit Questionnaire (SAQ) of the European Network for Smoke-free Hospitals. The SAQ enables hospitals to monitor and review their own progress towards the achievement of a written smoke-free policy that ensures the attainment of a totally smoke-free environment. The SAQ is also a tool to acknowledge and reward continuous improvement by facilitating hospitals to categorize their progress. This instrument was developed to analyse the extent to which tobacco control measures are complied within hospitals [5]. The questionnaire includes 9 standards (see Figure 1) with different number of items: commitment (5 items), communication (1 item), education and training (4 items), identification and cessation support (8 items), tobacco control (2 items), environment (4 items), healthy workplace (6 items), health promotion (2 items), and follow-up (2 items). Each item is scored as follows: 0 = not implemented, 1 = less than half the aspects are implemented, 2 = more than half are implemented, 3 = fully implemented, NA = not applicable. The maximum score of the Self Audit Questionnaire is 102 points, as the sum of its 9 standards. The SAQ was developed by an experts' working group from the ENSH and piloted in smoke-free hospitals in Ireland, France, Finland, and Italy. No formal assessment of its psychometric properties has been done to date, but its feasibility has been tested [15]. The questionnaire was sent by e-mail to tobacco control coordinators in each hospital in April 2005 and April 2007 to be completed and returned to the Network coordinating centre. We gave participating hospitals four weeks to complete the questionnaire by group consensus and submit the results. The response rate was 100% both in 2005 and 2007.

The degree of implementation of the Smoke-free Hospitals Project was analysed by means of the score obtained in the SAQ. For the sake of simplicity, we standardized to 100. We computed the mean and 95% confidence interval (CI) of the overall score and the 9 policies standards included in the SAQ in 2005 and 2007, according to the type of hospital (general, reference and high technology), the number of beds (≤ 300 or > 300), the staff hired in hospitals (≤ 700 or > 700), the prevalence of tobacco consumption (< 30, 30–34, 35–39 and ≥ 40%), surveyed from 2003 to 2005, and the number of years as smoke-free hospital (≤ 4 or > 4). We calculated the percentage of change for the global score and for each policy standard. We used Wilcoxon signed-rank non-parametric test to

1. Commitment	**0**	**1**	**2**	**3**	**NA**	**Observations**
1.1 Organisation documents (general contracts, public documents, etc.) specify the smoke-free policy						
1.2 A designated committee is appointed to co-ordinate tobacco policy						
1.3 The chairperson of the committee is of senior management level						
1.4 Financial and human resources are allocated in the organisation's operational plan and/or contract						
1.5 Members of staff know they have the responsibility to take action in the control of the non smoking policy						
2. Communication						
2.1 Staff, patients, and visitors are informed of the organisation's smoke-free policy						
3. Education & Training						
3.1 Staff have been instructed on how to approach and inform smokers in accordance with the policy						
3.2 Brief intervention training is offered to all staff						
3.3 Key clinical staff have been trained in motivational and/or cessation techniques						
3.4 Policy briefings/training is facilitated within staff working time						
4. Identification & Cessation Support						
4.1 There is a systematic procedure in place for identifying smoking patients						
4.2 Motivational interviewing technique is applied during hospital stay						
4.3 NRT/pharmacological therapy is available						
4.4 There is a smoking cessation service available for hospital staff						
4.5 There is a smoking cessation service available for patients (in-patients and out-patients)						
4.6 There are information on smoking cessation available for visitors (parents, caregivers)						
4.7 There are specific resources allocated for cessation support activities						
4.8 There is a systematic follow-up procedure of the patients at one year						
5. Tobacco Control						
5.1 Smoking is prohibited in all eating, work and common areas used by staff, patients and visitors						
5.2 If smoking areas are designated, they are completely separated from non smoking areas						
6. Environment						
6.1 There is signage in all areas for staff, visitors and patients explaining the smoke free policy and indicating smoke free areas						
6.2 Ashtrays are only found in designated smoking areas						
6.3 Tobacco is sold within hospital buildings (0= yes, 3 = no sold)						
6.4 Visitors and patients are never exposed to passive smoking						
7. Healthy Workplace						
7.1 Staff are informed of tobacco policy during the recruitment process						
7.2 Ongoing education programmes regarding tobacco policy exist for staff						
7.3 Smoking habits of staff are monitored regularly						
7.4 Staff receive continuous support towards smoking cessation						
7.5 Members of staff are never exposed to passive smoking						
7.6 Tobacco policy has been incorporated into and enforced according to existing disciplinary procedures						
8. Health promotion						
8.1 Organisation promotes smoke-free activity outside of the organisation						
8.2 Organisation participates in local, national and international antismoking activities						
9. Monitoring						
9.1 The policy is audited and reviewed annually						
9.2 The quality of action plan is audited regularly						

Scoring: 0 = No, disagree/Not implemented, 1 = Less than half implemented, 2 = More than half implemented, 3 = Yes, agree/Fully implemented, NA = non-applicable

Figure 1
European Self-Audit Questionnaire (SAQ) for monitoring policy standards at hospitals.

compare the SAQ scores of hospitals before and after the implementation of the smoking ban.

Results

We included the 32 hospitals at the consolidation stage of the Smoke-free Hospital project that had completed the SAQ in 2005 and in 2007. Thirteen were general hospitals, 12 reference hospitals, and 7 high technology hospitals. Fifteen hospitals were members of the Network for ≤ 4 years and 17 for > 4 years in 2007.

Total score of the Self-Audit Questionnaire according to hospital's characteristics before and after the smoking ban

The overall mean of implementation score of tobacco control policies was 52.4 (95% CI: 45.4–59.5) in 2005 and 71.6 (95% CI: 67.0–76.2) in 2007, with an increase from the baseline results obtained in 2005 of 36.7% ($p < 0.01$) (Table 1).

We observed the highest scores in 2007 in hospitals with smoking prevalence over 40%, with a mean of 78.8 (95%

CI: 60.8–96.7), and in reference hospitals with a mean of 74.2 (95% CI: 68.0–80.4). Hospitals with a smoking prevalence between 35–39%, and general and small (≤ 300 beds) hospitals attained the lowest scores (Table 1). By years of enrolment, the mean score obtained in 2005 was 22.6 points higher in those hospitals with > 4 years in the project than in hospitals with ≤ 4 years. However, the difference narrowed to 2.3 points in 2007 between these two groups of hospitals.

By level of health care, the hospitals that improved the most after the application of the national ban were the general hospitals (increase of 48%; $p < 0.01$), and those that increased less have been the high technology hospitals (increase of 21.4%; $p < 0.05$) (Table 1).

By number of beds and number of staff hired in hospitals, the increase has been higher in those with > 300 beds (increase of 41.1%; $p < 0.01$) and with ≤ 700 workers (increase of 51.3%; $p < 0.01$). Regarding smoking prevalence, hospitals with prevalence rate between 35–39% (increase of 72.2%; $p < 0.05$) and those with < 30% (increase of 65.2%; $p < 0.05$) were the ones with higher score increase after the application of the law. By years of implementation of the smoke-free hospital, those with ≤ 4 years of implementation growth the most (increase of 74.2%; $p < 0.01$).

Score and increase by policy standards of the Self-Audit Questionnaire before and after the ban

We observed that the scores in all the standards improved after the application of the national smoking ban. The standards with the highest increase were "healthy workplace" (increase of 78.3%; $p < 0.01$) and "health promotion" (increase of 57.1%; $p < 0.05$). Moreover, we enclosed standards that almost have achieved their maximum development at Catalan Network of Smoke-free Hospitals such "tobacco control" and "environment" (Table 2).

Comparing the results by level of hospitals, we observed a particular situation after the appliance of the tobacco control law, in the results obtained in "education and training" and "identification and cessation support". Whereas hospitals with reference level taught more of their staff in tobacco intervention, with a mean score of 7.5 (95% CI: 6.3–8.7), high technology hospitals offered more cessation program, with a mean score of 17.6 (95% CI: 11.1–23.2; $p < 0.05$). Finally, hospitals with ≥ 4 years in the network are the ones that apply more cessation programs (mean score = 14.6; 95% CI: 11.5–17.6), and hospitals with < 4 years educated and trained more their staff members (mean score = 7.4; 95% CI: 7.2–14.5) ($p < 0.01$).

Table 1: Self-Audit score according to hospitals' characteristics before (2005) and after (2007) the implementation of the Spanish tobacco law.

	2005		2007			
	Mean	**95% CI**	**Mean**	**95% CI**	**p***	**% Increase**
Overall score (n = 32)	52.4	(45.4–59.5)	71.6	(67.0–76.2)	< 0.01	36.7
Level of health care						
General hospital (n = 13)	46.0	(33.3–58.6)	68.1	(59.1–77.3)	< 0.01	48.0
Reference hospital (n = 12)	54.7	(40.7–68.5)	74.2	(68.0–80.4)	< 0.05	35.6
High technology hospital (n = 7)	60.6	(52.2–68.9)	73.5	(61.3–85.8)	< 0.05	21.4
Beds						
≤ 300 (n = 16)	52.4	(41.6–63.2)	69.1	(61.4–76.8)	< 0.01	16.7
> 300 (n = 16)	52.5	(42.1–63.0)	74.1	(68.4–79.8)	< 0.01	41.1
Staff						
≤ 700 (n = 14)	47.4	(33.7–61.1)	71.7	(62.7–80.8)	< 0.01	51.3
> 700 (n = 18)	56.4	(48.7–64.0)	71.5	(66.3–76.7)	< 0.01	26.7
Tobacco prevalence						
< 30% (n = 6)	43.4	(22.9–63.9)	71.7	(62.6–80.7)	< 0.05	65.2
30–34% (n = 16)	63.4	(56.9–70.0)	74.6	(67.0–82.2)	< 0.05	17.6
35–39% (n = 7)	35.8	(17.1–54.6)	61.7	(53.0–70.3)	< 0.05	72.2
≥ 40% (n = 3)	50.7	(-2.8–104)	78.8	(60.8–96.7)	NS	55.4
Years of adscription (in 2007)						
≤ 4 years (n = 15)	40.4	(29.0–51.9)	70.4	(62.3–78.4)	< 0.01	74.2
> 4 years (n = 17)	63.0	(57.4–68.7)	72.7	(66.7–78.5)	< 0.05	15.3

CI: confidence interval
NS: no statistically significant $p > 0.05$
* p-value for Wilcoxon's signed rank test

Table 2: Scores according to standards of the SAQ before (2005) and after (2007) the implementation of the Spanish tobacco law.

		2005		2007			
Standard	**Maximum Score available**	**Mean**	**95%CI**	**Mean**	**95%CI**	**p***	**% Increase**
Commitment	15	9.1	(8.1–10.0)	11.1	(10.1–12.0)	< 0.01	22.5
Communication	3	2.3	(1.9–2.7)	2.7	(2.6–2.9)	< 0.01	18.4
Education and training	12	4.8	(3.6–6.0)	7.1	(6.1–7.0)	< 0.01	47.6
Identification and cessation support	24	8.7	(8.7–12.8)	12.8	(10.5–15.7)	< 0.01	47.1
Tobacco control	6	4.7	(4.1–5.5)	5.7	(5.4–6.0)	< 0.05	21.2
Environment	12	10.1	(9.1–11.2)	11.8	(11.7–12.0)	< 0.01	16.8
Healthy workplace	18	7.4	(5.6–9.2)	13.2	(12.0–14.5)	< 0.01	78.3
Health promotion	6	2.1	(1.3–2.9)	3.3	(2.5–4.2)	< 0.05	57.1
Follow-up	6	3.7	(2.8–4.6)	5.1	(4.6–5.8)	< 0.05	37.8

CI: confidence interval
* p-value for Wilcoxon's signed rank test

Discussion

This study indicates how tobacco control policies, as measured by the scores of SAQ, have increased in hospitals after the implementation of a national tobacco control law. The hospitals that have increased the most were the general hospitals, those with > 300 beds, with staff ≤ 700, with tobacco consumption prevalence 35–39%, and with ≤ 4 years of participation. In terms of growth we observed that the highest raises have been produced in those hospitals with an initial worst situation. This could be partly explained by regression towards the mean [16]. However, the increase in SAQ scores was generalized in all hospitals except in four of them (those with the highest scores pre-ban). Hospitals with a shorter enrollment in the Smoke-free Network have achieved similar scores than hospitals with more years in the Network after the enforcing of the ban.

Spain applied like other European countries (Norway, Ireland, Italy, Malta and Sweden) a national law that bans smoking in public places including hospitals. Comparing our results with a multi-country study run by ENSH, Catalonia has achieved a high implementation of the project only overcome by Ireland [17]. Although national and regional partial regulations were previously in force in our country, it is clear that the new comprehensive law has reinforced the accomplishment.

Hospitals members of the Catalan Network have increased their monitoring activities to measure progress toward a smoke-free policy after the implementation of the law. This fact suggests that hospitals identified their weakness to update and increase their quality in the search of the "gold standard".

Since 2004 the Catalan Network of Smoke-free Hospitals monitors the progression of tobacco control policies by means of the SAQ. The results have shown the annual growth of the ENSH standards according this evaluation tool. At the beginning of its use the mean SAQ score was 47.5 (year 2004) and three years later was 71.6. The utmost increase in tobacco control policies was achieved from 2005 to 2006 with a 25.1% increase in the score. This increase is twofold comparing to the preceding year (10.3%) and the observed in the subsequent year (9.2%). This pattern indicates that the new law has an independent effect besides the expected annual increase already observed.

In addition to the increase observed in SAQ scores, hospitals are still suitable to broaden their policies. Some areas that have achieved only 50% of their maximum score possible could be enhanced (i.e., "education and training", "identification and cessation support" and "healthy workplace"). So we should increase and intensify the hospitals' measures addressed to inform and ask for the commitment of the tobacco policies to new staff members, monitor their tobacco consumption, and provide cessation programs inside the institutions. The growth in those areas could be a solution to work out with the lack of support and fulfillment of health professionals in the implementation of smoke-free polices at hospitals showed in other studies [18,19]. Although smoking inside the hospitals is forbidden, there are still areas where SHS is detectable [14]. Policy infringements are common in hospitals and require reinforcement, including measures to control tobacco consumption and to reduce the visibility of health professionals smoking in their white suits [20].

Smoking by patients is still common and craving occurres frequently [21,22]. Therefore smoking care practices, such as identification of smoking status, counseling, and provision of cessation therapy, are necessary [6]. Even in the context of smoke-free hospitals site, the majority of patients who are smokers receive inadequate smoking care [23]. From our study, training and education in tobacco cessation and intervention programs are still areas to enhance. Although previous instructive tobacco

cessation initiatives in our context have shown that teaching increases professionals' knowledge of psychological skills and pharmacological resources, no changes have been observed in professionals' attitude in providing help to quit [24]. The lack of systematic protocols to attend smokers at hospitals could be a barrier to apply the knowledge of professionals. Hospital policies should include intervention protocols for all units and services, where all the professionals had the responsibility to tackle the issue as a front line issue in their everyday practice. Without clear and easy protocols regarding cessation there is limited support to integrate cessation into clinical practice [25]. Smoke-free policies should be viewed as a part of large comprehensive strategies, the implementation of which is arguably the most important action of heath prevention, promotion, and recover from illness. The constant strengthening of the smoke-free hospital policy and its active promotion seems a central determinant of successful policies.

Among the potential limitations of the study we should note that the questionnaire has been filled in by the Project's Coordinators, after a consensus meeting with others key persons involved in tobacco control in the hospitals. Therefore, some bias due to self-complacency can not be ruled out. The Catalan Network compares this data with other more objective results, such as the tobacco consumption surveys, airborne nicotine measurements, and observational surveys of tobacco consumption signs. Up to now, the SAQ has not been formally validated against these objective measures, but the observed agreement between them is high.

We should also mention some strengths of this study. We have annually assessed the tobacco control policies at hospitals using the SAQ since 2004, which permits to evaluate both the individual progression of the hospitals and the progression of the Network. In addition, this tool is used by more than 1180 European Hospitals and should allow contrasting our results with other national or regional Networks.

Conclusion

This research has important public health and policy implications for tobacco control in hospitals. First, we have seen that national smoking bans are effective in combination with other initiatives such as the Catalan Network of Smoke-free Hospitals. Second, the yearly assessment of tobacco control policies by the SAQ helps to identify the strengths and weaknesses in each hospital, so best strategies towards a smoke-free policy can be developed. And third, hospitals should incorporate effective smoking cessation interventions as part of a standard practice. Consequently, tobacco regulations and bans should be accompanied by organizations and resources to guarantee the implementation of policies.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

CM and EF conceived and designed the study. CM supervised the study and data collection, interpreted the data, and wrote the first draft of the manuscript. JMM and MF were responsible for the analysis and interpretation of data. MB, MP, and EC were involved in data collection and with EF, ES and MG revised the manuscript for intellectual content. All authors read and approved the final manuscript.

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Secondhand smoke in hospitals of Catalonia (Spain) before and after a comprehensive ban on smoking at the national level

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ABSTRACT

Objective. To assess changes in secondhand smoke exposure by means of airborne nicotine concentrations in public hospitals of Catalonia (Spain) before and after a comprehensive national smoking ban.

Methods. We monitored vapor-phase nicotine concentrations in 44 public hospitals in Catalonia (Spain) before the smoking ban (September–December 2005) and one year after (September–December 2006). We installed 5–7 sampling devices per hospital for 7 days in different places (228 pairs of samples), and 198 pairs of samples were available for the final analysis.

Results. The median nicotine concentration declined from 0.23 μg/m^3 (interquartile range: 0.13–0.63) before the law to 0.10 μg/m^3 (interquartile range: 0.02–0.19) after the law (% decline=56.5, $p<0.01$). We observed significant reductions in the median nicotine concentrations in all hospital locations, although secondhand smoke exposure was still present in some places (main hospital entrance, emergency department waiting rooms, fire escapes, and cafeterias).

Conclusions. Secondhand smoke in hospitals has decreased after the ban. Assessment of airborne nicotine concentrations appears to be an objective and feasible system to monitor and reinforce the compliance of smoke-free legislations in this setting.

Introduction

On January 1st 2006, Spain was the seventh European country after Finland, Ireland, Norway, Malta, Italy and Sweden that enacted a comprehensive regulation to prevent and control smoking. Smoking is banned in all indoor public workplaces, public transport, hospitality venues (with some exceptions), schools and universities, retail stores and shopping centers, as well as hospitals and other health care facilities (Fernandez, 2006). Although smoking in hospitals was already partially banned by previous regional and national laws, there was in fact a scarce fulfillment. Some hospitals opted to be smoke-free on their own initiative or in coordinated efforts such as the European Network for Smoke-free Hospitals and national networks (Fiore and Jorenby, 1992; Garcia et al., 2006).

Beside some flaws of the new Spanish law regarding restaurants, bars and pubs (Fernandez, 2006; Toledo, 2006), smoking is now totally banned in any location within hospitals and health care buildings, eliminating smoking rooms, smokers' cafeterias and smokers' areas within cafeterias. Since 2000, in Catalonia (Spain), the Catalan Network for Smoke-free Hospitals has granted practical guidance on implementing comprehensive tobacco control policies to the hospitals voluntarily affiliated to the Network (Mendez et al., 2004; O'Riordan, 2005) and provides continuous counseling to become a smoke-free hospital. The main areas of action concern ensuring the compliance of the norm, providing tobacco control training, designing and applying cessation programs addressed to professionals, patients and visitors, and guaranteeing common follow-up and evaluation (Garcia et al., 2006; Martinez et al., 2008).

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Previous studies have evaluated SHS exposure using self-reported surveys or markers such as airborne nicotine in hospitals (Lopez et al., 2004; Martinez et al., 2008; Navas-Acien et al., 2004; Nebot et al., 2005; Stillman et al., 2007) and a few have used airborne nicotine to evaluate tobacco control policies in this setting (Becker et al., 1989; Stillman et al., 1990). However, there are no systematic assessments of secondhand smoke (SHS) in hospitals after a comprehensive national tobacco control law took effect.

This study evaluates the impact of the new law on SHS exposure in public hospitals in Catalonia, Spain, by assessing concentrations of airborne nicotine before (2005) and after (2006) the comprehensive national tobacco control law came into force.

Methods

Design and population

By the time of enforcing the new law (January 2006), 44 out of the 61 public hospitals (directly managed by or serving to the National Health Service) had joined the Network and had actively implemented the smoke-free hospital project (Garcia et al., 2006). These 44 hospitals participated in this study. Secondhand smoke was estimated by passive sampling of vapor-phase nicotine. A common protocol for the assessment of nicotine concentrations was developed, based on a previous multicountry study (Nebot et al., 2005). The sampling devices consists of a plastic cassette (with a windscreen on one side) containing a filter treated with sodium bisulphate that has a diameter of 37 mm (Hammond and Leaderer, 1987). The number of sampling devices was set according to hospital size (7 devices in hospitals with ≥300 beds, 5 devices in hospitals with 300 to 100 beds and 3 devices in hospitals <100 beds). Sampling devices were installed by a trained researcher in public and staff locations common for all the hospitals that covered: cafeterias (registering in 2005 whether smoking was totally permitted, totally prohibited or whether cafeterias had smoking areas), staff dressing room (surgical area), general surgery and general medicine hospitalization units (corridor), fire escapes (top floor), emergency department waiting room, and main entrance hall, according to previous studies (Lopez et al., 2004; Nebot et al., 2005). Permission to place sampling devices was obtained from the hospitals directors. The sampling devices were installed following a standard protocol: they had to hang freely in the air, not to be placed within 1 m of an area where someone regularly smokes, where air does not circulate such as a corner, or under a shelf, or buried in curtains. The devices were installed for 7 days and in the same locations during the same months (September–December) in 2005 and 2006. For each sampling device the following data were recorded: hospital and location, date and hour when placed and removed, sampling location area, sampling location volume and ventilation.

Both at baseline and at follow-up, 228 sampling devices were installed. Of these, 15 devices got lost at baseline, and 18 devices at follow-up (in 3 locations the devices were lost both at baseline and follow-up). Hence, the before-after pairs of devices available for analysis were 198. The median number of sampling devices for analysis by hospital was 5, ranging between 2 and 7. The lost devices had been more frequently installed in the emergency department waiting rooms ($n=8$), fire escapes ($n=7$), and cafeterias ($n=6$).

Nicotine assessment

Nicotine was extracted from the filter in the sampling devices and analyzed by means of gas chromatography/mass spectrometry at the Laboratory of the Public Health Agency of Barcelona (limit of quantification: 5 ng of nicotine in filter, equivalent to 0.02 μg/m^3 per an exposition time of one week). The concentration of airborne nicotine was computed by dividing the amount of nicotine collected by the filter (μg) by the flow rate (24×10^{-6} m^3/min) and allowing for the time (minutes) the filter had been exposed. Samples with nicotine concentrations below the quantification limit were assigned a value of 0.01 μg/m^3 (half of the limit of quantification), according to the 7-day exposure time (10080 min). For quality-control purposes, blank filters were placed within sampling filters (one filter in 20) and all of them had nicotine concentrations below the detection limit.

Statistical analysis

Given the skewed distribution of nicotine concentrations, we computed medians and interquartile ranges (IQR) to describe the data. We compared paired differences using Wilcoxon signed rank test for bivariate analyses, and used box-plots in logarithmic scale to graphically present the distribution of nicotine concentrations in cafeterias within the hospitals according to type of regulation at baseline. We used SPSS v. 12.0.1 for all the analyses.

Results

Half of the 44 centers in the study were county hospitals of basic health care level, 10 were reference hospitals and 12 were university hospitals. The median number of beds was 250, with 18 hospitals having more than 300 beds, and the median number of workers was 612, with one third of the hospitals having more than 800 workers.

We detected airborne nicotine in 191 locations at baseline in 2005 (96.5% of the sample) and in 131 locations at follow-up in 2006 (66.2% of the sample). At baseline, the overall median nicotine concentration was 0.23 μg/m^3 (IQR, 0.13–0.63) and 0.10 μg/m^3 (IQR, 0.02–0.19) at follow-up (% decline = 56.5, $p<0.01$) (Table 1). We found no differences

Table 1
Airborne nicotine concentrations (in μg/m^3) in 44 hospitals in Catalonia (Spain) before (September–December 2005) and after (September–December 2006) the ban on smoking

	Nicotine concentration (μg/m^3)				
	Number of samples	Baseline median (IQR)	Follow-up median (IQR)	Difference %	*p*-value
All locations	198	0.23 (0.13–0.63)	0.10 (0.02–0.19)	−56.5%	<0.01
By location					
Hall, main entrance	40	0.19 (0.13–0.63)	0.13 (0.06–0.22)	−31.6%	<0.01
Emergency Department, waiting room	35	0.23 (0.15–0.52)	0.16 (0.07–0.24)	−30.4%	<0.01
General Medicine, hospitalization unit	41	0.18 (0.10–0.33)	0.01 (0.01–0.10)	−97.2%	<0.01
Fire escape	26	0.31 (0.14–0.87)	0.15 (0.02–0.22)	−51.6%	<0.01
General Surgery, hospitalization unit	15	0.23 (0.09–0.42)	0.01 (0.01–0.14)	−97.8%	<0.01
Dressing room, surgical area	8	0.18 (0.08–1.17)	0.03 (0.02–0.23)	−83.3%	<0.05
Cafeteria	33	0.62 (0.23–3.43)	0.10 (0.02–0.18)	−83.9%	<0.01

IQR: Interquartile range.
p-value for comparison of paired medians (Wilcoxon signed rank test).

in the median nicotine concentrations at baseline and at follow-up according to the type (county, reference or university) or size of the hospital (number of beds and number of workers) (data not shown).

The median nicotine concentration at baseline according to locations of sampling devices is shown in Table 1. Median concentrations were highest in cafeterias (0.62 μg/m^3, IQR, 0.23–3.43), followed by fire escapes (0.31 μg/m^3, IQR, 0.14–0.87), and lowest in the surgical area dressing room (0.18 μg/m^3, IQR, 0.08–1.17). SHS declined significantly in all locations one year after the law. The greater changes occurred in general surgery hospitalization units, from 0.23 μg/m^3 at baseline to concentrations under the limit of quantification at follow-up (% decline=97.8, $p<0.01$), and in general medicine hospitalization unit, from 0.18 μg/m^3 at baseline to concentrations under the limit of quantification at follow-up (% decline=97.2, $p<0.01$). Airborne nicotine concentrations declined at a lesser extent in the emergency department waiting rooms, from 0.23 μg/m^3 at baseline to 0.16 μg/m^3 at follow-up (% decline=30.4, $p<0.01$), and at the hall main entrance, from 0.19 at baseline to 0.13 μg/m^3 at follow-up (% decline=31.6, $p<0.01$) (Table 1).

In some hospitals, smoking was permitted in cafeterias before the ban (cafeterias for smokers or dedicated areas within general cafeterias), while after the ban smoking was totally prohibited in these places. In Fig. 1 we present the median nicotine concentrations in cafeterias according to the baseline regulation. The median nicotine concentration found in cafeterias where smoking was partially prohibited before the ban was 3.67 μg/m^3 (IQR, 3.04–6.25) at baseline and 0.25 μg/m^3 (IQR, 0.03–0.42) at follow-up (% decline=93.2, $p<0.05$), in cafeterias where smoking was totally permitted 3.61 μg/m^3 (IQR, 0.82–11.48) at baseline and 0.11 μg/m^3 (IQR, 0.05–0.19) at follow-up (% decline=97.0, $p=0.109$) whereas in non-smoking cafeterias the median nicotine concentration was already low at baseline (0.48 μg/m^3; IQR, 0.18–0.68) and declined at follow-up (0.09 μg/m^3, IQR, 0.02–0.17) (% decline=81.3, $p<0.01$).

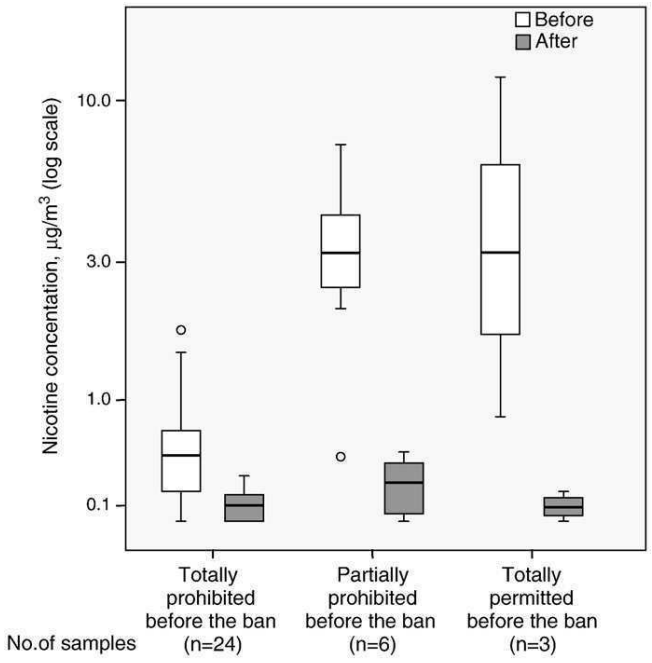

Fig. 1. Airbone nicotine concentrations (in μg/m^3) in cafeterias of hospitals in Catalonia (Spain) before (September–December 2005) and after (September–December 2006) the ban on smoking, according to regulations in each cafeteria before the ban. Boxes represent 25th and 75th percentiles of the observations, with the middle bar representing the median, and the whiskers values within 1.5 times the interquartile range. Circles represent extreme values.

Discussion

Main findings and comparison with other studies

Although airborne nicotine was detected at low levels in most places surveyed both before and after the ban (except in cafeterias), the concentrations decreased in most public hospitals after the ban. Cafeterias, where the highest nicotine levels were found at baseline, significantly reduced to levels similar to those found in the other locations studied. Hence, the new law boosted the compliance of the smoke-free areas in hospitals.

A comparison between hospitals according to the time of membership to the Network of Smoke-free Hospitals showed a greater decrease in airborne nicotine concentrations (65.2%) in the 39 hospitals affiliated more than 1 year than in those 5 hospitals affiliated for less than one year at the time of baseline measurements. Hence, all the reduction in the airborne nicotine concentrations after the law is not only attributable to the law itself, but also related in part to previous Network affiliation. It is likely that hospitals affiliated for longer were better prepared to face up the new regulation. The health policies and interventions proposed by the Network (Martinez et al., 2008) may be of help for a more effective compliance of the law, thus providing more resources to staff and patients for prevention and cessation.

This is the first study to systematically assess airborne nicotine concentrations in a large number of hospitals before and after a comprehensive ban on smoking. Previous studies have analyzed SHS in hospitals as part of more general cross-sectional surveys measuring nicotine in different public places. In an early study in Barcelona, Spain, in 2000 (Jane et al., 2002), measurements in two hospitals showed nicotine concentrations between the limit of quantification and 1.6 μg/m^3. A study of SHS in different public places of 7 European countries conducted in 2001–2002 (Austria, France, Greece, Italy, Portugal, Spain, and Sweden) (Gorini et al., 2004; Lopez et al., 2004; Nebot et al., 2005), which included 22 hospitals and a total of 93 samples, showed median nicotine concentrations between the limit of quantification and 4.0 μg/m^3. A survey conducted in 11 Latin American countries, which included 1 hospital in each country (Argentina, Brazil, Chile, Costa Rica, Guatemala, Honduras, México, Panamá, Paraguay, Perú, and Uruguay) (Barnoya et al., 2007; Barrientos-Gutierrez et al., 2007; Navas-Acien et al., 2004) showed median nicotine concentrations between the limit of detection and 1.33 μg/m^3. Another cross-sectional survey conducted in China (Stillman et al., 2007) during 2005, which included 7 hospitals, showed nicotine concentrations between 0.02 μg/m^3 and 2.21 μg/m^3. The median concentrations observed in Catalonia (Spain), both before and after the ban, were lower than the measurements in other countries, where smoking may be allowed in some areas within hospitals (Barnoya et al., 2007; Gorini et al., 2004; Navas-Acien et al., 2004). Although not very high, these nicotine concentrations represent a hazard of exposure to different carcinogens: a person inhaling during one week the average nicotine concentration of airborne nicotine found in hospitals before the law (0.23 μg/m^3) would have an intake of *N*-nitrosodimethylamine equivalent to that of actively smoking 0.6 cigarettes (Hammond, 1993).

Controlling smoking and SHS exposure in health care centers is hence a basic step in implementing such comprehensive tobacco control policies. Article 8 (Protection from exposure to tobacco smoke) of the WHO Framework Convention on Tobacco Control (WHO, 2003) addresses the need to protect non-smokers from SHS exposure. In addition, clear guidelines for its implementation have been further developed (Convention of Parties (WHO FTCT), 2007), including the need of governments to implement comprehensive smoke-free legislations. The new Spanish law does not allow smoking rooms or designated areas within hospitals, and consequently the overall nicotine concentrations decreased after the ban, as shown by this study. Since 1992, the US Joint Commission on Accreditation of Health

Care Organizations has required to accredited hospitals to be totally smoke-free (Joint Commission on Accreditation of Healthcare Organizations, 1991). The concept of "smoke-free hospital" should be expanded to its surrounding non-enclosed areas (i.e., campus, outside halls or terraces, entrances, and outdoor fire escapes).

The European Network for Smoke-free Hospitals has developed a self-audit instrument that enables hospitals to monitor the compliance with the smoke-free policy (Garcia et al., 2006; O'Riordan, 2005). In addition, the measurement of airborne nicotine is a feasible tool to monitor the compliance with the smoke-free project, as the present results also show. One of the pioneering experiences of eliminating smoking at hospitals, conducted at the Johns Hopkins Medical Institutions (Baltimore, USA) in the late 1980s, used among different indicators of smoking control the monitoring of nicotine concentration before and after a non-smoking policy (Becker et al., 1989; Stillman et al., 1990). Other markers of tobacco indoor pollution, such as the measurement of fine particulate matter, particularly those smaller than 2.5 μm in diameter ($PM_{2.5}$) (Abt et al., 2000; Repace and Lowrey, 1980), may be useful for monitoring SHS in hospitals. $PM_{2.5}$ measurement have already been used in bars and restaurants (Repace et al., 2006; Semple et al., 2007; Valente et al., 2007) and have a very high correlation with airborne nicotine and carcinogenic SHS compounds (Bolte et al., 2008).

Limitations of the study

We measured airborne nicotine in the 44 hospitals voluntarily affiliated to the Catalan Network of Smoke-free Hospitals, which are thought to perform better in tobacco control than those hospitals ($n=17$) still not affiliated. The previous Catalan legislation banned smoking in hospitals, although smoking rooms and cafeterias for smokers or with smoking areas were allowed. Before the new law, most of the hospitals not included in this study had smoking rooms, and some of them had developed initiatives for tobacco control on their own.

A number of lost devices occurred in places where high nicotine concentrations were found, such as fire escapes, cafeterias or emergency department waiting rooms. Although these selective losses could reduce the overall nicotine concentrations, the analyses by location show a consistent pattern of decrease.

Strengths of the study

This study, however, is the first that systematically includes a large number of hospitals in a defined country with sufficient sampling locations within each hospital, whereas previous studies with higher number of samples analyzed were limited in the number of hospitals included (Navas-Acien et al., 2004; Nebot et al., 2005; Stillman et al., 2007). To our knowledge, this is the first study in hospitals with a longitudinal design with repeated measures before and after a national tobacco control law. Another strength of this investigation is the SHS marker used. Airborne nicotine is a specific marker of SHS exposure (Jaakkola and Jaakkola, 1997) and the methods used have been validated (Hammond et al., 1987) and previously used in several studies (Gorini et al., 2004; Jane et al., 2002; Lopez et al., 2004; Nebot et al., 2005).

Conclusions

The data show that before the law the compliance with smoking bans in hospital facilities in Catalonia (Spain) was good, but not complete. After the complete ban, SHS levels have decreased in hospitals, but there is room for improvement in some specific areas, such as the main entrance, fire escapes, emergency department waiting rooms, and cafeterias. The new law seems to decrease SHS exposure, but reinforcement in health policies is necessary and advisable to ensure the best compliance. Assessment of airborne nicotine concentrations appears to be an objective and feasible system to monitor and reinforce the compliance of smoke-free legislations in this setting. These objective measurements, that complement other monitoring methods such as self-audit instruments or visual inspection of locations, can easily be adopted by the corresponding public health or hospital authorities.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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Contributors: EF, MF, CM, ES and MJL designed the study. MF, CM and AM collected the data in the participating hospitals. FC and GM did the nicotine analysis. MF, MJL and MN supervised and performed quality-control procedures. MF, JMMS, MJL and CM administered and prepared the data base. EF, JMMS and MF designed the strategy of statistical analysis and analyzed the data. All the coauthors contributed to the interpretation of results. EF drafted the manuscript, which was critically revised by all coauthors. All coauthors approved the final version of the manuscript. EF is the guarantor.

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5.4. Artículo 4

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Second-hand smoke exposure in a sample of European hospitals

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ABSTRACT: Smoking in hospitals is banned in many European countries; nevertheless, the level of compliance is diverse, and, in some cases, smoking areas remain. The present study describes the levels of second-hand smoke, as derived from respirable suspended particle measurements, in a sample of European hospitals during the year 2007.

The present study was a multicentric descriptive cross-sectional study carried out in 30 hospitals in seven European countries (Austria, Belgium, France, Germany, Greece, Romania and Spain). Particulate matter with a 50% cut-off aerodynamic diameter of 2.5 μm ($PM_{2.5}$) concentration was measured by means of a hand-held laser-operated monitor of particle size and mass concentration in six selected indoor locations. Medians and interquartile ranges of $PM_{2.5}$ concentration were computed in order to describe the data by country and location of measurement.

The median $PM_{2.5}$ concentration in all countries and locations was 3.0 $\mu g \cdot m^{-3}$, with half of the measurements ranging 2.0–7.0 $\mu g \cdot m^{-3}$. $PM_{2.5}$ levels were similar across countries. Eleven (5.5%) measurements were $>$25.0 $\mu g \cdot m^{-3}$, which is the 24-h mean limit recommended by the World Health Organization outdoor air quality guideline.

The present results show that exposure to second-hand smoke in this sample of European hospitals is very low, and can be easily monitored in order to ensure smoke-free legislation compliance.

KEYWORDS: Environmental tobacco smoke, Europe, hospitals, particles with a 50% cut-off aerodynamic diameter of 2.5 μm, second-hand smoke, tobacco smoke pollution

Second-hand smoke (SHS) or exposure to environmental tobacco smoke has important public health implications. It has been classified as a lung carcinogen [1], and has been proven to have adverse health effects on children and adults, including heart disease, lung cancer and other respiratory disorders [2].

Smoking in hospitals is completely banned in many European countries by national or regional laws [3]. In these countries, as well as in countries without complete bans on smoking, some hospitals have opted to go smoke-free on their own initiative or in association with national networks integrated within the European Network of Smoke-free Hospitals (ENSH). The ENSH is a nongovernmental organisation coordinating national and regional smoke-free networks in 20 European countries including ~1,400 hospitals. The ENSH promotes common strategies for obtaining tobacco-free environments and providing active support for quitting by patients, visitors and staff among European hospitals. ENSH activities are based on a European code of smoke-free hospitals and health services, providing various tools to support successful implementation of tobacco-free policies in health facilities [4].

To date, few studies have used direct measurements of SHS to monitor the accomplishment of the smoke-free hospital policy [5, 6]. Exposure to SHS has been measured by various methods, such as questionnaires (based on self-reports) and markers of SHS, namely substances found in tobacco smoke (such as nicotine) that can be measured in body fluids (urine, blood and saliva) or in the air to provide an objective measure of SHS exposure [7]. Airborne markers, such as vapour-phase nicotine or respirable suspended particles indicate the mean exposure level in a specific setting, and are easier to obtain than biological samples [8]. Among respirable suspended particles, those with a 50% cut-off aerodynamic diameter of 2.5 μm (commonly known as fine particles or $PM_{2.5}$) are widely used for SHS assessment in enclosed settings [9–11]. $PM_{2.5}$ originate from all types of combustion,

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including motor vehicles, residential wood burning, forest fires, some industrial processes, *etc.* Although $PM_{2.5}$ may derive from particles of dust and other combustion activities, smoking is generally the greatest contributor to indoor air pollution [12]. The aim of the present study was to describe the levels of SHS, as derived from $PM_{2.5}$ measurements, in a sample of European hospitals during the year 2007.

MATERIAL AND METHODS

The present study was a multicentric descriptive cross-sectional study among a convenience sample of 30 hospitals in seven European countries with different smoking prevalence rates and tobacco control activity (table 1). One hospital from Austria, five from Belgium, three from France, five from Germany, seven from Greece, four from Romania and five from Spain were included. Most of the hospitals were in urban areas and were general and specialised (maternity, oncological and children's) hospitals. Most of them were affiliated to a university (nursing or medical school), and all were members of the ENSH. The national coordinator of the smoke-free network in each country asked various hospitals to participate, taking into account the limited time-frame for making the measurements in each country (because the particle monitor had to go from one country to another; see below). The initial goal was to include five hospitals in as many countries as possible, and collaboration from seven countries was finally obtained.

A common protocol (derived from a previous study [6]) was used to sample and record the $PM_{2.5}$ measurements. Six standard locations were defined within each hospital for measurement performance by centrally trained investigators: main entrance hall, emergency department waiting room, internal or general medicine hospitalisation unit, general surgery hospitalisation unit, cafeterias, and fire escapes. In addition, measurements were taken in other areas using the local investigator's criteria when the standard sampling areas were not available. Smoking areas in hospitals with these zones were also measured. Except in halls, all locations were unaffected by air flows that can potentially influence the distribution of particles in the air. For each $PM_{2.5}$ measurement, the following data were recorded: hospital and location, date of measurement, sampling area, sampling volume, ventilation, and signs of smoking (tobacco smell, cigarette butts on the floor, and presence of ashtrays and persons smoking). Since the study only involved environmental measurements and not interventions or measurements in humans, approval from ethics committees was not required.

The $PM_{2.5}$ concentration was measured with a pre-calibrated hand-held laser-operated monitor of particle size and mass concentration (Aerocet 531; Metone Instruments, Inc., Grants Pass, OR, USA) [14]. The operation was manual, with a user-friendly interface. The device was used with a short length of Tygon on a flat surface, not on the floor of the room, preferably in the middle, and away from any doors or windows. Owing to logistic constraints and because all locations were indoors, short (2 min), for a mass-sample type, monitoring sessions were carried out in each location. The device displayed $PM_{2.5}$ concentration and relative humidity on its screen, which were recorded by the same device and then transferred to a computer in the coordinating centre. The hospitals were sampled between March and July 2007 in all of the countries except for Romania (September to October 2007). The measurements were performed over 1–2 weeks consecutively by the local researcher, using the same device in the seven countries.

Given the skewed distribution of the $PM_{2.5}$ concentrations, medians and interquartile ranges were computed to describe the data, and boxplots with logarithmic scales used to graphically present the distribution of $PM_{2.5}$ concentrations by country and location. Tests for linearity were performed in order to explore the trends in $PM_{2.5}$ concentrations by signs of smoking.

RESULTS

A total of 199 $PM_{2.5}$ measurements were obtained within 30 hospitals across seven European countries: 30 in halls or main hospital entrances, 29 in emergency department waiting rooms, 22 in internal or general medicine hospitalisation units, 27 in cafeterias, 22 in fire escapes, 22 in general surgery hospitalisation units, and 39 in other places, including eight smoking areas (Belgium and Greece).

The overall median $PM_{2.5}$ concentration was 3.0 $\mu g \cdot m^{-3}$, with half of the measurements ranging 2.0–7.0 $\mu g \cdot m^{-3}$. Similar $PM_{2.5}$ levels were found across countries (table 2), with the lowest median concentration occurring in Germany (five hospitals

TABLE 1 Prevalence of smoking, type of smoking legislation in healthcare facilities and tobacco control activity in seven European countries

	Austria	Belgium	France	Germany	Greece	Romania	Spain
Population age yrs	⩾14	⩾18	⩾12	⩾15	12–64	⩾15	⩾16
Year of survey	2004	2002	2005	2003	2000	2004	2003
Smoking prevalence[#] %							
Males	48.1	30.0	28.2	33.2	46.8	40.0	34.1
Females	46.5	25.0	21.7	22.1	29.0	19.5	22.4
Smoking regulation in healthcare facilities[¶]	Ban	Ban	Ban	Voluntary agreement	Ban	Ban	Ban
TCS score[¶,+]	35	58	59	37	36	50	55

TCS: Tobacco Control Scale. [#]: [3]; [¶]: [13]; [+]: maximum 100.

with a total of 30 measurements) and the highest in Romania (four hospitals with a total of 24 measurements). Eleven measurements were above the accepted 24-h mean limit recommended by the World Health Organization (WHO) outdoor air quality guideline (25.0 $\mu g \cdot m^{-3}$) (fig. 1) [15], and five measurements were above the level recommended by the US Environmental Protection Agency (35.0 $\mu g \cdot m^{-3}$) [16]. These measurements were taken in cafeterias, smoking areas and other zones in hospitals in Greece, Belgium and Romania, respectively.

The median $PM_{2.5}$ concentrations in all of the countries by location ranged between 2.0 (surgery hospitalisation units) and 4.0 $\mu g \cdot m^{-3}$ (internal medicine hospitalisation units) (table 2). Half of the measurements provided concentrations ranging 2.0–8.0 $\mu g \cdot m^{-3}$, with a few levels of >10.0 $\mu g \cdot m^{-3}$ in halls, waiting rooms in emergency departments, internal medicine hospitalisation units, cafeterias and fire escapes (fig. 2). There were no wide variations across the seven countries, with the exception of Greece, Spain and Romania, which presented relatively higher concentrations. The measurements taken in smoking areas showed the highest median $PM_{2.5}$ levels (*i.e.* 55.5 $\mu g \cdot m^{-3}$ in Belgium), with some levels of >60 $\mu g \cdot m^{-3}$. The median $PM_{2.5}$ concentration in locations with no signs of smoking was 4.0 $\mu g \cdot m^{-3}$ (interquartile range: 2.0–8.0 $\mu g \cdot m^{-3}$), and significantly increased to 6.0 $\mu g \cdot m^{-3}$ (interquartile range 4.0–32.5 $\mu g \cdot m^{-3}$) when all smoking signs were present (p=0.020 (test for linearity)).

DISCUSSION

The present study shows, for the first time with a European perspective, that levels of exposure to SHS in hospitals, as measured by $PM_{2.5}$ concentration, are relatively low and without striking differences across countries. Most of the countries in the present study had passed specific smoking bans for healthcare facilities at the time of the study [3]. Some of these bans, however, had exceptions and permitted smoking in designated rooms within hospitals or even cafeterias (with or without smoking areas). Those locations with concentrations of >25 $\mu g \cdot m^{-3}$ were smoking zones, one cafeteria located in a separate building next to the hospital and other zones. These other zones included areas with restrictions on smoking (such as consultation rooms, patient rooms and doctors' offices), and hence indicates infringement of the smoke-free policy. Although $PM_{2.5}$ detected in cafeterias might also originate from cooking in kitchens, most of the cafeterias did not have cooking facilities, and all of them had well-functioning built-in ventilation systems.

There are several particulate matter health effects on the respiratory and cardiovascular systems in children, adults and susceptible groups within the general population, and the epidemiological evidence shows adverse effects of particles after both short- and long-term exposure [17]. The present results show low overall $PM_{2.5}$ levels in hospital facilities; nevertheless, the risk of various outcomes increases with exposure, and there is little evidence suggesting a threshold below which no adverse health effects would be anticipated [17]. Thus, according to the WHO air quality guideline, the aim must be to achieve the lowest concentrations possible in order to minimise risk effects.

TABLE 2 Particle with a 50% cut-off aerodynamic diameter of 2.5 μm ($PM_{2.5}$) concentrations in 30 European hospitals by country and location of measurement, 2007

	Measurements n	$PM_{2.5}$ $\mu g \cdot m^{-3}$							
		All countries	Austria	Belgium	France	Germany	Greece	Romania	Spain
Measurements n		199	12	36	8	30	59	24	30
All locations	199	3.0 (2.0–7.0)	3.0 (3.0–3.8)	3.0 (1.0–3.8)	3.5 (3.0–13.0)	1.5 (0.0–3.0)	4.0 (2.0–7.0)	10.0 (8.3–20.3)	5.0 (2.0–9.5)
Hall (main entrance)	30	3.0 (3.0–5.3)	5.0 (4.0–6.0)	3.0 (3.0–4.0)	4.0 (2.0–16.0)	3.0 (1.5–4.0)	3.0 (3.0–6.3)		5.0 (1.0–10.0)
ED waiting room	29	3.0 (1.5–4.0)	3.0 (2.0–3.0)	2.0 (1.0–2.5)	4.0 (4.0–4.0)	0.0 (0.0–2.0)	3.5 (1.8–5.5)		3.0 (2.5–9.0)
Internal medicine HU	22	4.0 (1.8–7.3)		3.0 (1.5–5.5)	3.0 (3.0–3.0)	0.5 (0.0–7.0)	5.0 (2.0–8.0)		5.0 (3.5–16.0)
Cafeteria	27	3.0 (2.0–7.0)		2.5 (1.5–4.0)	3.0 (3.0–3.0)	3.0 (1.0–3.5)	7.0 (3.0–23.5)		5.0 (2.0–14.5)
Fire escape	22	3.0 (0.8–6.3)	3.0 (3.0– 3.0)	3.0 (0.0–3.0)	17.0 (17.0–17.0)	0.5 (0.0–1.8)	6.0 (3.0–8.3)		6.0 (3.0–11.0)
General surgery HU	22	2.0 (0.0–4.0)		0.5 (0.0–1.5)		0.0 (0.0–2.3)	2.0 (2.0–5.0)		4.0 (3.0–5.5)
Smoking area	8	18.5 (3.5–59.8)	3.0 (3.0–3.0)	55.5 (34.3–67.8)		2.0 (2.0–2.0)	6.0 (5.0–7.0)		
Other places	39	8.0 (3.0–13.0)	3.0 (3.0–3.5)			2.0 (2.0–2.0)	3.0 (0.8–5.0)	10.0 (8.3–20.3)	

Data are presented as median (interquartile range). ED: emergency department; HU: hospitalisation unit.

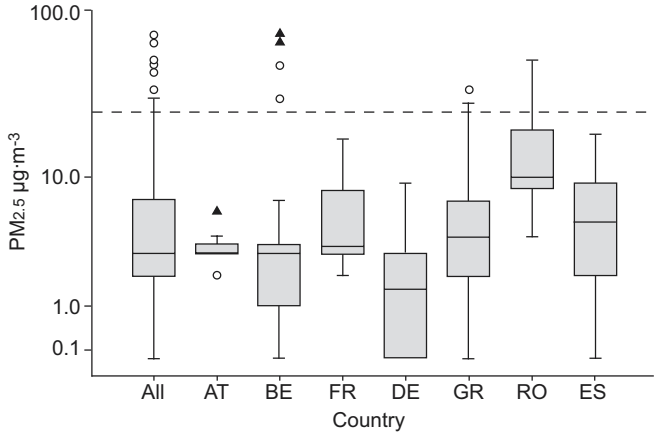

FIGURE 1. Boxplot showing distribution of particle with a 50% cut-off aerodynamic diameter of 2.5 µm ($PM_{2.5}$) concentrations (log scale) in 30 European hospitals by country, 2007. Boxes represent median and interquartile range; vertical bars represent values within 1.5 times the interquartile range (○: outliers; ▲: extreme values; - - - - -: 24-h mean limit recommended by the World Health Organization outdoor air quality guideline (25.0 $\mu g \cdot m^{-3}$)). All: all countries (n=199); AT: Austria (n=12); BE: Belgium (n=36); FR: France (n=8); DE: Germany (n=30); GR: Greece (n=59); RO: Romania (n=24); ES: Spain (n=30).

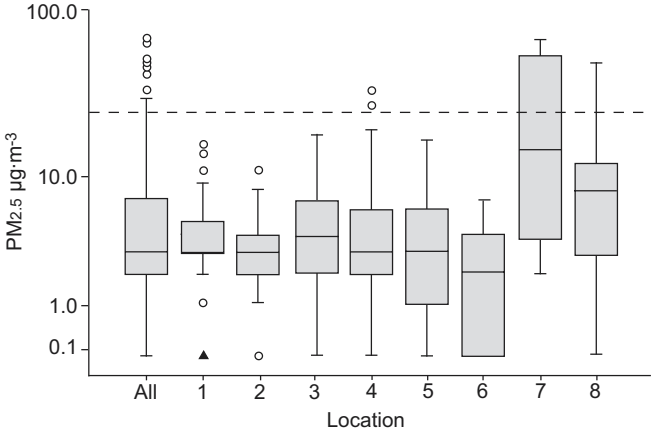

FIGURE 2. Boxplot showing distribution of particle with a 50% cut-off aerodynamic diameter of 2.5 µm ($PM_{2.5}$) concentrations (log scale) in 30 European hospitals by location of measurement, 2007. Boxes represent median and interquartile range; vertical bars represent values within 1.5 times the interquartile range (○: outliers; ▲: extreme values; - - - - -: 24-h mean limit recommended by the World Health Organization outdoor air quality guideline (25.0 $\mu g \cdot m^{-3}$)). All: all places (n=199); 1: hall (main entrance) (n=30); 2: emergency department waiting room (n=29); 3: internal medicine hospitalisation unit (n=22); 4: cafeteria (n=27); 5: fire escape (n=22); 6: general surgery hospitalisation unit (n=22); 7: smoking area (n=8); 8: other places (n=39).

Although all of the hospitals in the present study had implemented tobacco control policies following the ENSH code and standards, they did not have the same level of restriction, enforcement and fulfilment due to inter-country differences in legislation [3]. For example, smoking rooms inside hospitals were permitted in Austria, Belgium, Germany and Greece (table 2). Differences in baseline tobacco consumption among the population and the anti-smoking climate should also be taken into account. For example, Greece and Austria had high smoking prevalences, and, with Germany, had the lowest scores on the Tobacco Control Scale (table 1) [13]. These facts could well explain the different levels of SHS found in some areas in some hospitals.

Most of the measurements were below the 24-h mean limit recommended by the WHO and US Environmental Protection Agency for both outdoor and indoor air [15, 16]. The chemical composition of outdoor pollutants can differ from that of the indoor air measured in the hospitals. Outdoor $PM_{2.5}$ concentrations used to be higher than indoor levels, although the time of exposure should also be considered for risk assessment. Moreover, the air quality guidelines refer to 24-h or annual mean level, instead of the present spot measures. Although the site of exposure, indoors or outdoors, determines the composition of the air and concentration of the various pollutants, it does not directly affect the exposure–response relationship [15, 17].

Few studies have assessed SHS in hospitals. A pioneering study that measured airborne nicotine concentrations in 22 hospitals in seven European cities (Vienna (Austria), Paris (France), Athens (Greece), Florence (Italy), Porto (Portugal), Barcelona (Spain) and Örebro (Sweden)) during 2001–2002 showed low but detectable SHS exposure in hospitals [5, 18, 19]. Similar surveys conducted in 11 Latin American countries and China, including one hospital in each country between 2002 and 2006, also showed low but quantifiable nicotine concentrations [20–23]. In a previous study in Catalonia, Spain, low levels of airborne nicotine were found in 44 public hospitals before the new Spanish tobacco control law came into force in 2006, which subsequently mostly decreased to unquantifiable concentrations after the ban [6]. However, $PM_{2.5}$ concentrations have been scantily used in the monitoring of SHS in hospitals, except for some pilot experiences in Italy [24] and Greece [25]. These studies indicate that measurement of $PM_{2.5}$ concentrations is a feasible and sensible method of SHS assessment in hospitals.

Some limitations of the present study merit consideration. First, the sample of participating hospitals was small (even considering that this is the first study to systematically survey 30 hospitals in different countries), and hospitals were recruited using a convenience framing approach and not selected at random. An attempt was made to ensure internal validity of the measurements by selecting the participating hospitals, given the complexity of the multi-country study. Secondly, a standard and accepted methodology was used to measure $PM_{2.5}$ levels, by means of a commercial particle size monitor. The same monitor was used in all of the hospitals, and the local researchers in charge of the measurements were trained using a common protocol. Climatic conditions may have changed from hospital to hospital and country to country given that the field work was extended over several months. However, the mean temperature during measurements in all of the countries was 22.1°C, and the mean relative humidity was 39.6%, without huge variations across countries. Although 2-min measurements were performed in each location, 10–20-min mean measurements have been used in other studies. However, the reliability of the recordings was warranted by the good consistency of the different data from smoke-free locations of the same hospital on the same day, such as measurements in halls, emergency department waiting rooms

and internal medicine hospitalisation units. The differences in $PM_{2.5}$ concentrations found between locations where smoking was forbidden and those where it was permitted are also an indicator of the reliability of measurements. $PM_{2.5}$ variations in hospitals are supposed to be very small in comparison to measurements carried out in other more polluted environments, such as pubs or bars, where mean concentrations over long periods of time are preferred. Thirdly, the number of sampling locations within each hospital was limited to six common places. It was not possible to survey more locations for operational reasons. However, this distribution of samples provided a good estimate of SHS levels in a previous study [5], and prevents an excessive variety of locations, which would make comparisons by location across countries unfeasible. Finally, there was a failure to obtain outdoor measurements for comparison with in-hospital measurements, although, given the low levels obtained indoors, the comparison group would have been almost useless. Last but not least, in the interpretation of the results, it should be taken into account that SHS is not the only source of indoor particulate matter, although it is considered its main contributor.

In conclusion, exposure to SHS, as measured by mean $PM_{2.5}$ level, is very low across the present sample of European hospitals. Use of $PM_{2.5}$ concentration as a marker of exposure to SHS appears to be a feasible method of comparing compliance with smoke-free regulations in hospitals both within and between countries. Periodical surveys of SHS exposure in hospitals following a common, standard and easy to implement protocol should be developed and promoted by the European public health authorities.

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STATEMENT OF INTEREST

A statement of interest for C. Martínez can be found at www.erj.ersjournals.com/misc/statements.dtl

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5.5. Artículo 5

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Effectiveness of a coordinated smoking cessation program addressed to hospital workers

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This paper evaluates the success of the Catalan Network of Smoke-free Hospitals smoking cessation program in terms of abstinence among workers of the 33 participating hospitals.

Take-away points

- The probability of abstinence after six months follow-up of tobacco cessation programs addressed to hospital workers is higher in the framework of a coordinated public health program compare to the effectiveness of communitarian programs.
- Hospital workers with a lower or medium nicotine dependence according to FTND score obtained better continuous smoking abstinence at six months follow-up.
- Combined treatment (NRT & bupropion) increased the probability of abstinence compared to the other pharmacological treatment options.
- Coordinated smoking cessation programs, based on the provision of common tools and free of charge treatment, are feasible and successful.

Abstract

Objective: The Catalan Network of Smoke-free Hospitals coordinates a smoking cessation program addressed to hospital workers. This study evaluates the effectiveness of the smoking cessation program in terms of abstinence.

Study Design: Follow-up study of the 930 hospital workers treated in the cessation units of the 33 participating hospitals between July 2005 and December 2007.

Methods: The program included training, a common software for program implementation, free pharmacological treatments, and active follow-up during six months after smoking cessation. We calculated 6-month abstinence probabilities by means of Kaplan-Meier curves according to sex, age, years of tobacco consumption, profession, Fagerström Test for Nicotine Dependence (FTND) score, and use of pharmacotherapy.

Results: Overall abstinence probability was 0.504 (95% CI: 0.431-0.570) at 6 months of follow-up. Abstinence was higher in men (0.526, 95% CI: 0.398-0.651) than in women (0.495, 95% CI: 0.410-0.581). Doctors had higher abstinence (0.659, 95% CI: 0.506-0.811) than nurses (0.463, 95% CI: 0.349-0.576). Workers with high nicotine dependence (FTND >7) had lower abstinence probability (0.376, 95% CI: 0.256-0.495) than workers with FTND score ≤6 (0.529, 95% CI: 0.458-0.599). We observed the highest abstinence probabilities in workers treated with combined pharmacotherapy (0.761, 95% CI: 0.588-0.933).

Conclusions: Significant predictors of abstinence were: smoking 10-19 cig/day, present low or medium FTND score, and use of combined treatment. The results show the feasibility and success of a smoking cessation program for hospital workers coordinated at the regional level.

Keywords: Smoking cessation; Program Evaluation; Hospitals, Database.

Introduction

Health risks associated with tobacco consumption are well documented. At the beginning of the 21st century, tobacco consumption continues to be the single most important cause of preventable morbidity and mortality in Spain.[1] Health professionals should be an example in tobacco control initiatives, playing an active role in curbing the epidemic. However, health professionals' smoking is itself often a barrier for their participation in tobacco control.[2-4] In Catalonia (Spain), 24.5% of physicians and 35.1% of nurses are smokers.[5] In this sense, it is well known that health professionals who smoke are less likely to intervene and encourage their patients to quit smoking.[6,7] Thus, health professionals are among the first targets for tobacco control.[8]

The World Health Organization (WHO) emphasizes the value of a non-smoking hospital staff and a smoke-free hospital environment, and recommends conducting programs to help health workers quit in order to increase their participation in tobacco control.[9] Smoking bans in hospitals encourage smoking cessation and should be considered in the list of strategies to reduce and prevent smoking among health professionals.[10] Progressive implementations of tobacco control policies help to increase the readiness to quit among hospitals workers, reduce cigarette smoking, but have actually a small impact in decreasing their tobacco consumption.[11-13] Workplace tobacco cessation programs have been associated with several advantages such as: helping to reach a great number of smokers, providing peer group support for remaining tobacco abstinent, and assisting the young healthy adult.[14-16]

Moreover, there is evidence that workplace interventions that include advice from a health professional, an individual and/or group counseling, and pharmacological treatment to overcome nicotine addiction are effective.[14] However, there is insufficient evidence to

determine the effectiveness of incentives or competitions, when implemented alone.[17] Besides, there are few studies that report comprehensive tobacco cessation strategies to help hospital workers to quit smoking.[18,19] Furthermore, to our knowledge there are no previous studies about tobacco cessation programs in hospitals coordinated at a regional or national level.

This paper evaluates the effectiveness of the Catalan Network of Smoke-free Hospitals smoking cessation program in terms of abstinence among workers of the 33 participating hospitals in Catalonia (Spain).

Materials & Methods

Setting

The Catalan Network of Smoke-free Hospitals is a public initiative that promotes the implementation of tobacco control policies by applying the European Network of Smoke-free Hospitals' guidelines (ENSH) in the hospitals serving the National Health System in Catalonia, Spain. The Catalan Network promotes a "smoke-free hospital" based on an organizational and cultural change.[13,20] This project requires the commitment of the hospital to adopt the European Code and Standards of the ENSH project (www.ensh.eu). In each hospital, a smoke-free policy working group composed of managerial and key professionals within the institution is created. This working group is responsible for the design, scaling down, communication, monitoring, streamlining, and evaluation of the hospital's tobacco control policy. The working group communicates the new policies to the rest of the staff members, patients, and community. The Network helps the working groups to provide common tools for implementation and evaluation, and promotes to share experiences.[20]

In the process of becoming a smoke-free hospital, the Network guides each institution by providing expert counseling and support. Once the hospital achieves the basic standards –

commitment; communication; and tobacco control,[13] it should go further and offer tobacco cessation programs. In this regard, the Network Coordinator Center provides a set of strategies to implement policies in hospitals such as: (1) education and training in tobacco cessation and (2) a common smoking cessation program that targets health professionals in a first phase and patients in a second phase. These active policies and the evaluation activities are funded by the Catalan government since the year 2005. [21]

Since its beginnings in 1999, fifty out of the sixty-one public hospitals had decided to join the Network up to December 2007. Thirty-three hospitals offered the tobacco cessation programs to workers and fifteen offered this service to hospitalized patients. Among the 33 hospitals with tobacco cessation programs to workers, 12 were general hospitals, 12 reference hospitals, and 9 high technology hospitals. From them 17 had ≤300 beds, and 16 had >300 beds. Moreover, 10 had ≤700 hospital workers, and 23 had >700 hospital workers. Smoking prevalence before implementing the intervention was less than 30% in 9 hospitals, between 30-35% in 16 hospitals, between 35-39% in 5 hospitals, and ≥40% in 3 hospitals.

The Tobacco Cessation Program

The tobacco cessation program (TCP) is a comprehensive program to promote, monitor, and evaluate tobacco cessation interventions in the Smoke-free Hospitals. The Catalan Network provides hospitals with the resources needed to implement tobacco cessation programs, such as education, tobacco therapy, and web-based software. The web-based software is managed through the Internet and aims to register, monitor, and control the inventions of the program in each hospital, facilitating the centralized collection and management of the data.

Hospitals interested in implementing the TCP are asked a detailed proposal with the implementation process, available resources, flow paths, and available personnel. The feasibility of the program according to these resources is studied beforehand by the coordination of the Network. The protocol should follow pharmacological and psychosocial

treatment recommendations according to Fiore's guideline[22], based on the Prochaska and DiClemente transtheoretical model of stages of change[23], and provide at least three assessments of abstinence after the day of quitting (during the first, third, and the sixth month).

Once the program is approved, health professionals of each centre are trained on both tobacco cessation interventions and in the management of the software. Afterwards, the educational material such as motivational cessation leaflets and free pharmacological treatments are distributed. Pharmacological treatment was chosen by both the clinician and the smoker. The treatment, dose, and duration of the pharmacological aid follow an internal common hospital protocol based on Fiore's guideline.[22] These protocols were previously reviewed and approved by the project coordinator of the Catalan Network of Smoke-free Hospitals.

The project coordinator in each hospital is responsible for informing hospital workers about the intervention using flyers, e-mail, and other available local resources (i.e., hospital's intranet) which included information such as the contact number and consultation hours. The intervention, mainly with an individual approach and with a minimum of 6 months of follow-up, is run by specialists of each centre (mainly nurses or doctors), specially trained in cessation. The coordinator presents the program to each smoker interested in the intervention and suggests the most suitable treatment according to their tobacco dependence, preference, and previous experience in quitting (no pharmacologic treatment; nicotine replacement therapy -NRT-, including nicotine gums, lozenges, and/or patches; bupropion; and combined pharmacological treatment, NTR+bupropion). Each hospital is responsible for ensuring the confidentiality of their patients and issuing a follow-up appointment.

Since the TCP was incorporated as a usual practice in each hospital and it involved the use of common non-experimental treatments, no ethical approval by the Research and Ethics Committee was needed for this follow-up study. To evaluate the compliance with the

program the project coordinator at the Catalan Network reviewed the quality of the data and the adherence to the protocol at least once a month using the remote software.

Study design

This is a follow-up study of the employees who wanted to quit smoking and agreed to participate in the smoking cessation program in the 33 hospitals that were members of the Network up to 2007. Verbal and written information about the characteristics of the electronic data record was provided to all the participants. The inclusion criteria for the participants were the following: being daily or occasional smoker, hospital worker of any of the hospitals that offered the cessation intervention, and agree with having 6 months of follow-up after the quitting day. Among the exclusion criteria we included participants who did not want to be followed during this period of time and refused to be included in the study. The initial assessment included questions on demographics such as date of birth, sex, profession, ward or working area; detailed history of smoking including current and past consumption, age at initiation, number of cigarettes smoked, nicotine dependence[24,25], and exhaled carbon monoxide (eCO) concentrations as an optional information. Additional information included the desire and confidence in quitting, personal and social resources, and a list of advantages and disadvantages about smoking valued by users themselves. Once the diagnostic was done, the cessation plan was arranged with the hospital worker with a minimum follow-up of 6 months. The follow-up consisted of a minimum assessment of abstinence and behavioral counseling after the first, third, and the sixth month after the day of quitting. The follow-up data included the number of abstinence days and the registration of relapse or lapse episodes. Moreover, other data such as the withdrawal symptoms and clinical observations were included. Finally, we registered the type of treatment provided by visit: non-pharmacological or pharmacological, which may include NRT (in form of patch, lozenge

and/or gum) or bupropion. Varenicline was not available at the time this study was conducted. The treatment dispensed was free of charge for smokers enrolled in the program.

Main outcome and independent variables

The main outcome variable was duration of sustained abstinence. We considered quitting smoking as continued abstinence during a 6-month period. Thus, participants were considered to have relapsed if they smoked on one or more days.[26] The time of relapse was calculated as the number of days from the quit date to the date of the relapse. Those patients who relapsed immediately after the intervention (n=259) were included in the analysis and were assigned a 1-day time to relapse.

The main independent variables were sex, age, years of consumption, profession, tobacco dependence measured by the Fagerström Test for Nicotine Dependence (FTND),[27] and pharmacological treatment. The age variable was transformed in three categories according to approximate tertiles (<35, 35-44, and ≥ 45 years old). Profession was classified as doctors, nurses, and other hospital workers (i.e., technicians, administrative staff, support staff, etc.). Age of initiation was categorized as <16, 16-18, and ≥ 19 years old. Years of consumption were categorized as < 15, 15-24, and ≥ 25 years. We also aggregated the number of cigarettes consumed daily as <10, 10-20 and >20. The FTND includes six questions to assess tobacco dependence: time to the first cigarette smoked after waking, difficulty in refraining from smoking where it is forbidden, cigarette that smoker hates most to give up, number of cigarettes smoked per day, time of the day when smoking is more frequent, and smoke when ill. Its score ranges between 0 and 10, with higher scores indicating more nicotine dependence. Tobacco dependence was classified as low (FTND: 0 to 3), moderate (FTND: 4 to 6) and high addiction (FTND: 7 to 10).[27] Finally, pharmacological treatment was registered into four categories: no treatment, NRT (including nicotine gums, lozenges, and/or patches), bupropion, and combined treatment (NRT and bupropion).

Data analysis

We used the Kaplan-Meier method to estimate cumulative abstinence (probability of continued abstinence) and 95% confidence intervals (CI) at 6-month follow-up by all the independent variables. In addition, we performed separate analysis by sex and age. Afterwards, we adjusted Cox regression models to estimate the relative risk [estimated as hazard rate ratios (HR) with 95% confidence intervals (CI)] for relapse at the end of follow-up to assess the independent contribution of each variable. We first assessed the crude HR of relapse and afterwards we fitted adjusted models for sex, age, and the rest of variables to investigate potential confounding. We finally chose the model adjusted for all variables. We checked the proportionality of the hazards during the follow-up. We used SPSS v. 14 for all the analyses. Last but not least, data was aggregated to evaluate the effectiveness of the program in the regional network. For this study, authors ruled out calculating the effectiveness of the cessation program for each hospital.

Results

Description of the participants enrolled in the TCP

1,087 hospital workers who smoked were included in the TCP among the 33 hospitals. We considered the subjects recruited from July 2005 to December 2007. From these, 157 (14.4%) were excluded because the quit day was missing. Therefore, data from 930 subjects were finally analyzed.

Table 1 shows the characteristics of the participants by demographic characteristics, tobacco consumption profile, and pharmacological treatment received. The workers were mainly women (71.3%), and were equally distributed among the three age groups. By profession,

28.1% were nurses, 10.2% were doctors, 15.4% administrative employees, and 46.3% other professionals (i.e., statisticians, technical assistants, physics, informatics, and others).

Most workers enrolled in the program were heavy and long-time smokers: 64.0% of them smoked ≥ 20 cigarettes per day, 46.2% smoked for ≥ 25 years (see Table 1), and 26.9% reported having a high dependence to tobacco according to the FTND. Close to 58% of the smokers had made one or two previous quit attempts, and 21.7% of them had made ≥ 3 attempts. Most of the smokers (83.4%) expressed being ready to make a plan to quit (preparation stage). From the different tobacco cessation treatments, NRT was the most used (51.9%). Bupropion therapy was used for 10.0% of the subjects, and 6.2% used both (NTR and bupropion). About 31.9% of the smokers did not use any kind of drug to quit (Table 1).

Smoking abstinence and predictors

The overall median of abstinence was 46.1 days. At the end of the 6-month follow-up, 62 men (out of 267) and 138 women (out of 663) were abstinent. Table 2 shows continuous smoking abstinence at 6 months and its predictors. Overall abstinence probability was 0.504 (95% CI: 0.431-0.570) at 6 months. The abstinence rate was slightly higher in men (0.526, 95% CI: 0.398-0.651) than in women (0.495, 95% CI: 0.410-0.581), although it was not statistically significant (p=0.198). Less nicotine dependent participants (FTND ≤ 6) were more likely to remain abstinent (0.529, 95% CI: 0.458-0.599; p =0.022). In addition, workers treated with combined treatment (NRT and bupropion) obtained a higher abstinence probability (0.761, 95% CI: 0.588-0.933) than workers following other treatments (no drug, NRT, or bupropion). Figure 1 shows the Kaplan-Meier curves with the probability of abstinence by sex, profession, nicotine dependence, and treatment.

To assess gender differences, we separately computed the probabilities of abstinence by sex (data not shown). Among doctors, no differences in the probability of abstinence were found.

Male nurses (0.662, 95% CI: 0.467-0.856) had a higher non-significant probability of remaining abstinent than female nurses (0.425, 95% CI: 0.299-0.550). Additionally, according to the overall FNTD score, men obtained a similar probability of abstinence regardless of their nicotine dependence, while women with lower FTND had a higher probability of abstinence than those with higher nicotine dependence (data not shown).

We examined the abstinence probabilities by age. We found a similar probability of abstinence in the 3 age groups considered, except when profession was taken into account. Doctors between 35-44 years old had the highest probability of abstinence (0.808, 95% CI: 0.568-1.041), which was two-fold that of nurses in the same age group (0.404, 95% CI: 0.174-0.633) (data not shown).

Finally, we investigated the risk of relapsing adjusting for all the independent variables (Table 3). Consistent with the previous analysis, we found that women had significantly higher risk of relapse than men (HR=1.44, 95% CI: 1.02-2.04). In addition, as compared to doctors, the "other professionals" group had a non-significant increased risk of relapsing (HR=1.55, 95% CI: 0.86-2.80). Risk of relapsing increased among participants who consumed more cigarettes per day (Table 3). As compared to participants not using pharmaceutical treatment, smokers with combined treatment had a significant lower risk of relapsing (HR=0.37, 95% CI: 0.16-0.87).

Discussion

The present study found that hospital smoker workers treated in the framework of a tobacco cessation program presented a high probability of remaining abstinent after six months of follow-up. Workers with a lower physical dependence were more likely to remain abstinent and those treated with combined pharmacological therapy (NRT and bupropion) obtained the highest abstinence probability at 6 months of follow-up.

There are two main reasons which might explain the observed differences in tobacco cessation in our study. On the one hand, nicotine dependence is a strong determinant of success in quitting.[28,29] On the other hand, the efficacy differences among the different pharmacological aids could determine the success. According to the last three meta-analyses about drug therapy for smoking cessation, varenicline, bupropion, and NRT were more helpful than placebo.[30-32] In addition, all forms of NRT increased the chances of quitting smoking by 50-70% after at least six months of follow-up (patch: odds ratio OR= 1.81, 95% CI: 1.63-2.02; gum: 1.66, 95% CI: 1.52-1.81).[32] Furthermore, evidence on the effect of combined treatment has been recently proved.[33,34] Nevertheless, there are few studies evaluating the effectiveness of pharmacological treatments in large populations outside the clinical trial context. Among those, data from the California Tobacco Survey showed that NRT, bupropion, or both, in association with smoke-free home policies, increased the abstinence in smokers of 15 or more cigarettes per day.[35] Unfortunately, we did not collect contextual data on smoking by others (relatives, friends) at the participants' homes.

By sex, we observed a statistically significant difference in the risk of relapsing among women compared to men. Moreover, in men tobacco dependence was not a clear determinant of quitting. By professional group, although the tendency of relapsing is higher in nurses and other professionals in comparison to doctors, we did not obtain statistically significant results. However, previous studies backed up the existence of marked differences between both groups (doctors versus other professionals) after conducting tobacco cessation programs.[36-40]

Those who smoked 20 or more cigarettes per day had less probability of relapse than those health workers smoking <10 cigarettes per day, while smokers that presented higher scores in the FTND had higher probability to relapse. This fact could suggest that the number of cigarettes is not an important predictor of relapsing like other indicators included in the FTND such as the first cigarette smoked, the difficulty to refrain from smoking in banned

places, or smoking more in the mornings than in the evenings. Moreover, Baha & Le Faou[41] suggest that the higher relapse observed among light smokers is linked to a higher rate of drop outs as compared to moderate and heavy smokers. Accordingly, in our data, the frequency of drop outs by consumption was 22.2% of light smokers, 12.1% of moderate smokers, and 17.4% of heavy smokers, as suggested by Baha & Le Faou.[41] In addition, our data indicate that the elevated success rates among smokers of 10-19 cigarettes per day were also linked to their greater use of bupropion and combined treatment (bupropion and NRT).

In the present study, the hospital workers treated in this TCP obtained a high probability of remaining abstinent. Health care cessation programs generally report quit rates of 13–30% at 6–12 months, indicating an important variability of success depending on the treatment and approach applied.[42,43] We presume that the good results in our study can be explained by the own characteristics of the program. First, by the array of advantages of workplace programs, such as: (1) provide access to a large number of healthy people, (2) boost participation, (3) encourage sustained peer group support, and (4) proximity of the treatment.[14] Second, the free cost of the pharmacology for all workers during the follow-up period. And third, the exclusion of the lost participants might select the most motivated participants, and in consequence boosting the smoking abstinence levels up.

As suggested by the WHO, health professionals should be leaders in promoting tobacco control activities.[9] To decrease the harms of tobacco in our society, improved interventions headed by health care professionals are needed.[44] Our data shows that a coordinated tobacco cessation program maintained by a regional network of smoke-free hospitals is feasible and effective in decreasing tobacco consumption in health organizations. Many studies have reported tobacco prevalence rates, attitudes, and behaviors among health professionals in Spain.[12,45-48] However, to our knowledge, no previous coordinated national or regional

tobacco cessation programs addressed to health workers have been implemented and evaluated. There are some programs in other countries that have also applied a coordinated strategy. For example, in Japan a coordinated national tobacco cessation program has proved that low intense interventions to health workers are effective.[49] Moreover, a tobacco cessation program coordinated by a health maintained organization (HMO) and led by primary care nurses in Pennsylvania achieved higher quit rates than that reported by the medical literature.[50] In addition, a national tobacco cessation program coordinated in Denmark has demonstrated that a common database helps to report the efficiency and cost-effectiveness of these interventions.[51] The regional strategy adopted in Catalonia helps to motivate hospital managers and project coordinators to implement not only cessation programs, but also to be active in implementing common tobacco control strategies. For instance, since starting the TCP for hospital staff, 15 out of the 33 participant hospitals have also offered a similar cessation program for patients during their hospital stay. In addition, we are conscious that the program was launched in July 2005, some months before the enforcement of the new smoking ban in Spain in January 2006. This factor could have had some impact on hospital workers' behavior, increasing the number of workers attending the TCP and also their level of motivation and readiness to quit. However, our data show no differences in the proportion of workers in the preparation stage before and after the implementation of the Law.

Some limitations of the present study deserve attention. First, we evaluated the effectiveness of a multicenter coordinated program in 33 hospitals, which share a standard protocol, some educational materials, and the same software. However, small differences in the way of applying the protocol interventions are possible because of heterogeneity across hospitals.

The purpose of this project was to foster hospitals to set up tobacco cessation programs to help their workers to quit smoking and to evaluate the usefulness of this experience. They counted with some external aid to help them to fit the program to the particular characteristics

of each hospital. Second, the follow-up was restricted to a 6-month period. Hospitals counted with some external aid to help them to fit the program to their particular characteristics. Second, the follow-up was restricted to a 6-month period. As stated by some tobacco cessation guidelines, 1-year follow-up and the use of exhaled CO (eCO) levels are fundamental to evaluate the effectiveness of such programs.[52] However, as mentioned, our program limited by design the follow-up period to 6 months, and we did not systematically collect eCO levels in all the participants because not all the hospitals had CO devices. However, we have analyzed the data from the 453 participants (48.7% of the total sample) who had their eCO assessed. Among quitters with data at 6-month follow-up (n=72), the mean concentration of eCO was 3.14 ppm (SD=1.28) and none of them had an eCO concentration higher than 6 ppm, the optimal cutoff to define smoking status.[53] Hence, there was no misclassification of smoking status among quitters with eCO measurements. Moreover, the main reason of lack of CO measurements was the unavailability of CO devices in all the hospitals and not the unwillingness of the participant to be tested. Thus, we consider that self-reported smoking status was valid in this study. Third, 259 individuals dropped out after the first visit, so we do not have data of them, and we assumed that they relapsed immediately after the first visit. This is a very conservative scenario, and hence it is likely that the actual cessation rates would be higher than those computed.

It is, however, worth mentioning some of the strengths of this program. Nearly 1,000 hospital workers have benefited from this free resource to quit smoking in their workplace. The common protocol and software used, which facilitated the follow-up, have helped to jointly evaluate the cessation program.

In conclusion, this tobacco cessation program is effective in helping hospital workers to quit, highlighting three useful considerations for future programs: first, the increased difficulty in quitting among smokers who present high nicotine dependence or have a long history of

consumption; second, differences in abstinence rates by sex and profession, pointing out the susceptible vulnerability of some groups such as female nurses; and lastly, the high abstinence rates obtained by use of combined therapies.

A precis to appear

This paper evaluates the success of the Catalan Network of Smoke-free Hospitals smoking cessation program in terms of abstinence among workers of the 33 participating hospitals.

Take-away points

- The probability of abstinence after six months follow-up of tobacco cessation programs addressed to hospital workers is higher in the framework of a coordinated public health program compare to the effectiveness of communitarian programs.
- Hospital workers with a lower or medium nicotine dependence according to FTND score obtained better continuous smoking abstinence at six months follow-up.
- Combined treatment (NRT & bupropion) increased the probability of abstinence compared to the other pharmacological treatment options.
- Coordinated smoking cessation programs, based on the provision of common tools and free of charge treatment, are feasible and successful.

Authors' contributions

CM an EF conceived and designed the study. MB, MP, EC, EF, JMSG, and ES supervised data collection. JMM and MF were responsible for the analysis and interpretation of data. CM, MB, MP, and JMM supervised the study, interpreted the data, and wrote the first draft of the manuscript, to which the rest of authors contributed. The local TCP project coordinators were involved in recruitment and treatment of participants. All authors and the TCP project coordinators read and approved the final manuscript.

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Table 1. Demographics, Tobacco Consumption & Treatment variables of 930 hospital workers included in the smoking cessation programme. Catalan Network of Smoke-free Hospitals, 2005-2007.

	n	%
Sex		
Men	267	28.7
Women	663	71.3
Age (years)		
<35	273	29.4
35-44	314	33.8
≥45	343	36.9
Profession		
Doctors	93	10.2
Nurses	257	28.1
Other professionals	564	61.7
Age of initiation (years)		
<16	280	30.4
16-18	424	46.1
≥19	216	23.5
Years of consumption		
<15	207	22.6
15-24	286	31.2
≥25	424	46.2
Number of cigarettes smoked per day		
< 10	45	4.8
10-19	289	31.1
≥ 20	589	64.0
Fagerström Test for Nicotine Dependence		
Low (0-3)	239	27.0
Medium (4-6)	407	46.0
High (7-10)	238	27.0
Pharmacological treatment		
None	221	31.9
NRT*	359	51.9
Bupropion	69	10.0
NRT & Bupropion	43	6.2

* NRT: Nicotine Replacement Therapy in any form (gums, lozenges and/or patches)

NOTE: The sum of the participants is not 930 because missing value.

Table 2. Probability (and 95% confidence interval, CI) of continuous smoking abstinence at 6 months and its predictors.

	Probability	95% CI	p-value*
All	0.504	0.431-0.570	-
Sex			0.198
Men	0.526	0.398-0.651	
Women	0.495	0.410-0.581	
Age (years)			0.746
<35	0.520	0.402-0.632	
35-44	0.469	0.360-0.578	
≥45	0.475	0.382-0567	
Profession			0.144
Doctors	0.659	0.506-0.811	
Nurses	0.463	0.057-0.349	
Other professionals	0.474	0.393-0.554	
Age of initiation (years)			0.870
<16	0.410	0.308-0.511	
16-18	0.533	0.448-0.617	
≥19	0.489	0.361-0.616	
Years of consumption			0.216
<15	0.549	0.417-0.680	
15-24	0.482	0.368-0.595	
≥25	0.451	0.368-0.533	
Number of cigarettes per day			0.033
< 10	0.367	0.104-0.629	
10-19	0.623	0.528-0.717	
≥ 20	0.426	0.351-0.501	
Fagerström Test for Nicotine Dependence			0.022
Low or Medium (< 6)	0.529	0.458-0.599	
High (≥7)	0.376	0.256-0.495	
Pharmacological treatment			0.004
None	0.382	0.262-0.501	
NRT**	0.483	0.387-0.576	
Bupropion	0.528	0.377-0.678	
NRT & Bupropion	0.761	0.588-0.933	

*Log-rank test

** NRT: Nicotine Replacement Therapy in any form (gums, lozenges and/or patches)

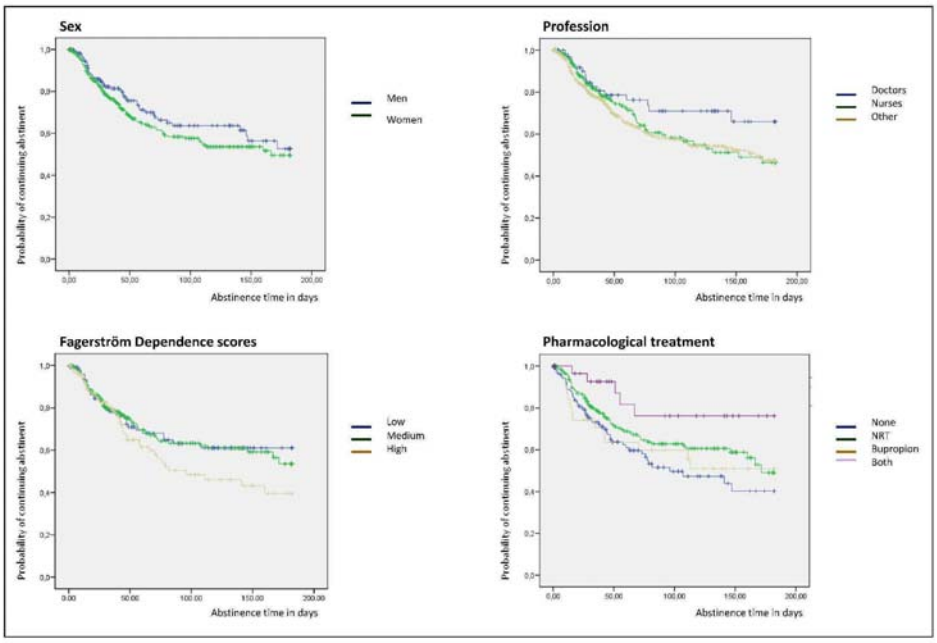
Table 3. Hazard ratios (HR) (and 95% confidence interval, CI) of relapse by independent variables adjusted for treatment.

	Crude		Adjusted*	
	HR	95% CI	HR	95% CI
Sex				
Men	1	-	1	-
Women	1.23	0.912-1.66	1.44	1.02-2.04
Age (years)				
<35	1	-	1	-
35-44	1.14	0.79-1.53	0.79	0.45-1.40
≥45	1.10	0.79-1.53	0.58	0.27-1.25
Profession				
Doctors	1	-	1	-
Nurses	1.52	0.87-2.63	1.26	0.69-2.40
Other professionals	1.66	0.99-2.79	1.55	0.86-2.80
Age of initiation (years)				
<16	1	-	1	-
16-18	0.73	0.54-0.99	0.92	0.64-1.33
≥19	0.74	0.52-1.06	1.15	0.73-1.80
Years of consumption				
<15	1	-	1	-
15-24	1.20	0.81-1.77	1.75	0.95-3.22
≥25	1.37	0.95-1.96	2.09	0.93-4.70
Number of cigarettes per day				
< 10	1	-	1	-
10-19	0.54	0.33-1.04	0.47	0.22-0.99
≥ 20	0.86	0.50-1.45	0.76	0.36-1.58
Fagerström Test for Nicotine Dependence				
Low (0-3)	1	-	1	-
Medium (4-6)	0.91	0.65-1.26	0.81	0.55-1.19
High (7-10)	1.33	0.93-1.91	1.17	0.75-1.83
Pharmacological treatment				
None	1	-	1	-
NRT**	0.78	0.57-1.07	0.81	0.58-1.14
Bupropion	0.82	0.51-1.34	0.813	0.48-1.36
NRT & Bupropion	0.35	0.12-0.83	0.37	0.15-0.86

*Adjusted for all the variables (sex, age, profession, age of initiation, years of consumption, number of cigarettes, Fagerström score and pharmacological treatment)

** NRT: Nicotine Replacement Therapy in any form (gums, lozenges and/or patches)

Figure 1. Kaplan-Meier survival curves of continuing abstinence probability of hospital staff participants according to sex, profession, Fagerström score, and pharmacological treatment.



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6. Discusión conjunta de los artículos

6. Discusión conjunta de los artículos

Los resultados obtenidos en esta tesis doctoral muestran como las políticas para el control del tabaquismo propuestas por el proyecto "Hospital sin Humo" tienen efectos beneficiosos. Fomentan la reducción de la prevalencia de consumo de tabaco entre los trabajadores, mejoran el cumplimiento de los espacios sin humo- protegiendo a trabajadores, usuarios y visitantes-, promueven el desarrollo e implementación de medidas internas y, fomentan la formación y el diseño de programas de identificación y ayuda al fumador en el seno de la propia organización. En definitiva, forjan organizaciones verdaderamente comprometidas y activas en el control del tabaquismo.

El proyecto "Hospital sin Humo" consigue reducir el consumo de tabaco entre los profesiones ejemplares (médicos y enfermeras) que muestran prevalencias de consumo inferiores a las descritas en otros trabajos de nuestro contexto (97,119). Sin embargo, estos resultados no son tan positivos como los descritos en otros países con mayor trayectoria en el control del tabaquismo. Así, entre los médicos- que han disminuido 4,8 puntos porcentuales, pasando de una prevalencia de consumo del 20,0% en el 2001 al 15,2% en el 2006- se obtienen tasas de consumo muy superiores a las obtenidas entre los médicos de Inglaterra o Estados Unidos (que presentan una prevalencia de consumo alrededor del 6%) (101,120). Entre las enfermeras- que han disminuido 1,4 puntos porcentuales en 6 años de implementación del proyecto "Hospital sin Humo"- se observa como al igual que en otros países de Europa la prevalencia encontrada es similar a la población general (entre 25-30% para el caso de la mayoría de países europeos y del 31% en el caso de España) (120). No obstante, en los Estados Unidos- país que va décadas por delante nuestro en el control de tabaquismo- las enfermeras fuman menos que la población general (13%) ejerciendo un importante rol activo en la provisión de intervenciones de ayuda a los fumadores hospitalizados (101).

Además, la implementación del proyecto "Hospital sin Humo" fomenta cambios en el patrón de consumo entre los fumadores que disminuyen el número de cigarrillos consumidos y avanzan en su nivel de preparación para dejar de fumar. Estos resultados son similares a los hallados en estudios similares (51,52). No obstante, trabajos previos nos advierten que sin una ayuda específica las recaídas son frecuentes.(78).

En este sentido, la evaluación del programa de deshabituación tabáquica dirigido a los trabajadores de los Hospitales sin Humo muestra una alta probabilidad de abstinencia a los 6 meses entre los fumadores trabajadores de 33 hospitales de la red. Los trabajadores con baja dependencia física a la nicotina obtuvieron mejor probabilidad de abstinencia que aquellos que tenían dependencia más alta. Asimismo, los tratados con tratamiento combinado donde se incluía tratamiento sustitutivo de nicotina (TSN) - es decir parches, comprimidos orales y/o chicles de nicotina- y bupropion obtuvieron mejores resultados. Estudios de seguimiento a largo término han observado que el uso de tratamiento farmacológico es determinante para mantenerse abstinente (121). No obstante, esta es la primera iniciativa de intervención coordinada que ayuda a dejar de fumar a colectivos ejemplares, utilizado el mismo protocolo, material, registro y terapia farmacológica. Aunque no hay trabajos similares publicados, se ha demostrado que la existencia de registros comunes entre centros que monitoricen las intervenciones para dejar de fumar resultan coste-efectivos, posibilitando la realización de evaluaciones (122).

Otra ventaja potencial al ayudar a los trabajadores del hospital a dejar de fumar es incrementar por un lado la imagen coherente del colectivo ejemplar, y por otro, fomentar su implicación en la atención del paciente fumador. Sin embargo, el número de trabajadores de acuerdo con ejercer un rol ejemplar ha disminuido. A la hora de ejercer un rol activo, se sabe, que el profesional sanitario fumador ofrece menos ayuda para dejar de fumar a los pacientes fumadores (123,124). Además, se conoce que pese a existir múltiples abordajes

efectivos para la cesación tabáquica, las intervenciones no suelen trasladarse a la práctica diaria. Sensibilizar y motivar a los profesionales sanitarios resulta imprescindible para avanzar en el desarrollo de actividades de control del tabaco (102). Estudios recientes han sugerido que formar a profesionales de enlace - que lideren y coordinen las intervenciones para dejar de fumar en el sí de las instituciones (125)- y crear sistemas de evaluación sobre el nivel de cumplimiento de las mismas (126), fomentan la correcta implementación y seguimiento de los programas para dejar de fumar, garantizando su sistematización. Estos elementos, junto a los ya desarrollados [como los programas de cesación tabáquica a trabajadores, formación, y evaluación de la prevalencia de consumo de tabaco bianualmente], deben ser considerados en el diseño de futuros programas en los hospitales. Por el momento, en nuestro contexto, la Red Catalana de Hospitales sin Humo, ha desarrollado un programa de cesación en el que se demuestra cómo es posible ofrecer ayuda para dejar de fumar a trabajadores fumadores mediante una estructura de coordinación en red. Este programa obtiene una alta probabilidad de abstinencia y consigue homogenizar la atención a nivel territorial.

En la monitorización de las actitudes de los profesionales de un hospital, se ha observado cómo el acuerdo con las políticas de control del tabaco ha aumentado año tras año con el refuerzo de las medidas. Estos datos son similares a los obtenidos en otros estudios realizados en nuestro país, que han evaluado el impacto de la Ley 28/2005. Dichos trabajos reportan como tras la puesta en vigor de la Ley se obtuvo un alto apoyo poblacional a la prohibición de fumar en lugares públicos incluidos los hospitales (94,1% de los encuestados les parecía “muy bien o bien”) (120).

Además, el proyecto ha incrementado progresivamente el cumplimiento de las zonas libres de humo, lo que ha provocado un substancial aumento en el número de trabajadores no expuestos al HAT durante la jornada laboral. Estudios similares nos demuestran cómo se obtienen mejores resultados en el cumplimiento de las normativas cuanto mayor son las medidas y restricciones empleadas (127).

Al evaluar el cumplimiento de los espacios sin humo mediante marcadores objetivos los datos corroboran como se ha producido una disminución del 56% en los niveles de nicotina en fase vapor tras la entrada en vigor de la Ley. Además, se observa como el programa "Hospital sin Humo" – junto al efecto de la Ley 28/2005- ha ejercido un importante impacto en el cumplimiento de los espacios sin humo. Otros estudios han evaluado cómo la exposición de HAT en el hogar, la escuela, el lugar de trabajo y el ocio disminuyó tras la puesta en marcha de la Ley (128). Un estudio realizado en Cataluña que evaluaba el nivel de explosión al HAT en centros de atención primaria reportó la existencia de bajas concentraciones de nicotina ambiental. Pese a ello tan sólo el 47% de los centros de primaria eran completamente libres de HAT (41). Otro trabajo realizado en 16 hospitales de la red pública gallega un año después de la Ley mostraba como sólo un hospital no presentaba nicotina en el ambiente (129). Aunque se observa en todos los casos niveles bajos de exposición al HAT, la presencia de concentraciones de nicotina en lugares donde está prohibido fumar plantea la necesidad de monitorizar el cumplimiento de la normativa mediante métodos objetivos. En los hospitales, resulta de interés monitorizar las áreas de hospitalización y cirugía, por cuestiones higiénicas, de seguridad y protección. Además, nuestro trabajo plantea la necesidad de vigilar especialmente las zonas donde se han detectado mayores niveles de nicotina como son: vestíbulos de las entradas, salas de espera y cafeterías. En este sentido cabe destacar, como la proximidad de puntos de fumar a ventanas o puertas de entradas debería estar completamente prohibido, ya que se conoce que las partículas pasan del exterior al interior de los edificios (130).

De este trabajo se desprende como el uso de nicotina en fase de vapor es una medida específica y selectiva que detecta un compuesto propio del HAT como es la nicotina. Sin embargo, su protocolo de recogida y su análisis la hacen más costosa que otras pruebas existentes como la determinación de $PM_{2.5}$. En este sentido, otros estudios han sugerido como la determinación de $PM_{2.5}$ pese a no ser un marcador selectivo del HAT es un método eficiente y efectivo para monitorizar el cumplimiento de los espacios sin humo (85,87,131). Otra investigación realizada recientemente en nuestro contexto ha mostrado una importante correlación entre los dos marcadores (130). En nuestros trabajos hemos observado como ambos sistemas son factibles para evaluar el cumplimiento de los espacios sin humo y cómo se pueden complementar con la evaluación de signos de consumo como son la presencia de personas fumando, el recuento de colillas y/o la detención de olor a tabaco. La elección de técnicas, o combinación de las mismas, dependerá de la elección de las entidades públicas competentes y las organizaciones hospitalarias, que deben valorar no tan sólo la fiabilidad, probada en ambos casos, sino también elementos logísticos y presupuestarios resultantes de la monitorización.

En nuestro trabajo de monitorización de la concentración de partículas $PM_{2.5}$ en siete países europeos se destaca que existe baja concentración de partículas en el global de las áreas estudiadas. Sin embargo, aún existen zonas que requieren seguimiento y evaluación al presentar concentraciones más elevadas. Además es de destacar que aunque no existen grandes diferencias entre las concentraciones de $PM_{2.5}$ entre los países, el nivel de protección ofrecido en los diversos países estudiados fue distinto (debido a las diferencias entre las legislaciones nacionales y políticas internas de los hospitales) que permitían crear lugares designados para fumar en algunos casos. Fue precisamente en estos lugares para fumar donde se detectaron elevadas concentraciones de $PM_{2.5}$. Estos lugares correspondían a salas para fumar o cafeterías donde se permitía fumar.

Vemos como el proyecto "Hospital sin Humo" desarrollado por la ENSH, e implementado en varios países, demuestra como el modelo es transferible a diferentes realidades, consiguiendo el cumplimiento de los espacios en los que se prohíbe fumar. En la Unión Europea coexisten diversas normativas de control de tabaquismo, que ofrecen diferente nivel de protección (132). En los países en los que se permite designar áreas para fumar en los hospitales (Alemania y Bélgica- de los estudiados en nuestro trabajo-) los trabajadores y sus usuarios están más desprotegidos y se benefician menos de los beneficios de una organización completamente sin tabaco. Esto sugiere que sus trabajadores están más expuestos al HAT, tienen menos estímulos para abandonar el tabaco y varían menos su patrón de consumo. Estos resultados indican que si bien el modelo de "Hospital sin Humo" facilita el cumplimiento de los espacios sin humo necesita el refuerzo de un marco legislativo que fomente la desnormalización del consumo de tabaco y garantice la protección a todos tal y como insta el artículo 8º del CMCT (20).

En el caso de los Hospitales de la Red Catalana se observa como globalmente se ha alcanzado un alto nivel de implementación de los estándares de la ENSH tras años de desarrollo y posterior aplicación de la Ley. Otros países de nuestro contexto que han aplicado leyes nacionales de control de tabaquismo, como es el caso de Irlanda, también presentan un alto nivel de implementación de acuerdo al cuestionario de autoevaluación o "self-audit" (133). Se observa como la Ley 28/2005 ha producido un avance en la puesta en marcha de políticas de control de tabaquismo en los hospitales. Así se ha producido un incremento de la puntuación global del self-audit en todos los hospitales catalanes evaluados antes y después de su puesta en marcha. Este aumento es el doble del producido en años anteriores, lo que refuerza la hipótesis que la Ley ha reforzado las actividades de prevención, cesación y control del tabaquismo. Además son los hospitales que llevaban menos tiempo desarrollando el proyecto los que presentan mayor incremento. Esto se debe a que partían de situaciones más desfavorables, y por lo tanto presentaban mayor margen de mejora.

De entre las políticas incluidas en los 10 estándares de la ENSH que han alcanzado mayor nivel de desarrollo están: "compromiso" con el proyecto, "comunicación" y "ambiente" -en el que se recoge como criterio el proveer de espacios sin humo-. Por otro lado, entre los estándares susceptibles a mejorar se encuentran "educación y formación", "identificación y apoyo a la cesación" y "lugares saludables". Estos resultados tienen importantes implicaciones para la salud pública y las organizaciones sanitarias que demuestran la necesidad de seguir desarrollando programas de formación y cesación dirigidos a trabajadores y pacientes.

En conclusión, el proyecto "Hospital sin Humo" y las medidas frente al tabaquismo incluidas en la Ley 28/2005 están relacionadas con una disminución de la prevalencia de consumo entre los profesionales ejemplares, una reducción en la exposición al HAT y un aumento de las iniciativas de control de tabaco en los hospitales. En Cataluña, se ha observado cómo los trabajadores de los "Hospitales sin Humo" apoyan las políticas de espacios sin humo y cumplen con la normativa. Además, la puesta en vigor de la Ley ha dinamizado el despliegue de programas e intervenciones de control de tabaquismo en los hospitales, principalmente en aquellos menos activos en el control del tabaquismo antes de la Ley.

Los avances obtenidos hasta el momento y los futuros retos que se nos presentan ayudarán a hacer de los hospitales organizaciones líderes en la prevención y control de tabaquismo, convirtiéndose en verdaderos modelos de organizaciones sanitarias que promueven, protegen y fomenten la salud.

7. Conclusiones

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- La introducción progresiva de políticas de control del tabaquismo en los hospitales se asocia con una ligera disminución del consumo de tabaco y la modificación del patrón de consumo entre los trabajadores fumadores. La política de espacios sin humo en los hospitales disminuye la percepción de la exposición al HAT e incrementa el cumplimiento auto reportado de la normativa entre los trabajadores.

- Los niveles de HAT monitorizados mediante nicotina aérea disminuyen en los hospitales tras la entrada en vigor de la Ley 28/2005.

- La presencia de HAT en los hospitales europeos monitorizada mediante $PM_{2.5}$ es baja, a excepción de la hallada en lugares en los que se permite fumar cuya concentración es elevada.

- La valoración de las concentraciones de nicotina aérea y de $PM_{2.5}$ resultan métodos objetivos y fiables de monitorización de los espacios sin humo y refuerzan el cumplimiento.

- Al comparar los resultados antes de la Ley 28/2005 (abril 2005) con los obtenidos dos años después de su implementación (abril 2007), se observa que las medidas de control del tabaco en los hospitales miembros de la XCHsF han aumentado (evaluadas mediante el cuestionario self-audit de la ENSH).

- El programa de cesación tabáquica coordinado por la XCHsF dirigido a los trabajadores hospitalarios fumadores produce una alta probabilidad de abstinencia a los seis meses. Los trabajadores con dependencia baja o media, fumadores de 10-19 cigarrillos al día, o que han seguido tratamiento combinado (bupropion y sustitutivos de nicotina) obtuvieron mejores tasas de abstinencia.

- El programa de cesación tabáquica de la XCHsF es una intervención coordinada a nivel regional de factibilidad y efectividad demostrada.

8. Implicaciones para la Salud Pública

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Los resultados y conclusiones de la presente tesis doctoral plantean las siguientes implicaciones para el avance y desarrollo de políticas y programas de control de tabaquismo en los hospitales:

- En la evaluación continua de las intervenciones de salud pública como las evaluadas es necesario incluir indicadores de proceso y de resultados. Además, para determinar la efectividad e impacto de las intervenciones ha sido muy útil comparar los resultados basales con los de seguimiento (evaluación pre-post). Del mismo modo, se demuestra la necesidad de incluir diferentes indicadores de evaluación al tratarse de un programa multicomponente.

- La alta prevalencia de consumo de tabaco entre los trabajadores del hospital, incluidos médicos y enfermeras, plantea la necesidad de mantener e incluso incrementar las ayudas y programas para dejar de fumar dirigidos a este colectivo ejemplar.

- Los programas de cesación tabáquica dirigidos a trabajadores de los hospitales deberían incluir terapia farmacológica y apoyo de un profesional experto durante al menos 6 meses.

- Debido al buen cumplimiento de los espacios interiores sin humo y el elevado apoyo de los profesionales la política de protección al HAT, los centros hospitalarios están en un buen momento para fortalecer la estrategia de "espacios sin humo" sin excepciones e incluir a los centros sociosanitarios y de atención a la salud mental, de modo que se proteja a toda la población tal y como insta el artículo 8º del CMCT de la OMS.

- Asimismo, se debe potenciar la adopción de medidas de control que incluyan todo el recinto hospitalario. Con ello, se potenciará el mensaje de organización sanitaria que proporciona salud y trabaja eficazmente en el control del tabaco, además de limitar el impacto visual de los grupos de fumadores en las puertas de entrada y evitar la difusión del HAT hacia las zonas interiores.

- Es necesario fomentar la implicación de los profesionales sanitarios en la atención a paciente fumador y el control del tabaco, mediante campañas de sensibilización, incentivos y el reconocimiento de esta actividad en la carrera profesional.

- Se deben potenciar registros comunes entre los hospitales y la atención primaria para facilitar la asistencia continuada al paciente fumador, de modo que se permita evaluar y monitorizar los resultados de las intervenciones.

9. Bibliografía

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10. Anexos

10.1. Anexo I

Proceso editorial y correspondencia con las revistas.

10.1.1 Correspondencia Artículo 1

Martínez C, García M, Méndez E, Peris M, Fernández E. Barriers and challenges for tobacco control in a Smoke-free Hospital. Cancer Nurs. 2008; 31 (2):88-94

Carta de presentación del manuscrito a CancerNursing

Cancer Nursing

Barcelona, April 4th 2007

Dear Editor:

Please find enclosed the manuscript "Barriers and challenges for tobacco control in a Smoke-Free Hospital". This paper identify the extent of smoking, compliance with tobacco restrictions, and attitudes toward smoking and tobacco control measures among the employees in a Comprehensive Cancer Center from 2001 to 2006. Thus, we would appreciate your considering this manuscript for publication as an Original Paper in *Cancer Nursing*.

The authors of the paper directly participated in the planning, analysis, and writing of the paper, have approved the final version here submitted, and will take public responsibility for the content of the paper.

The article is original and it is not submitted anywhere other than your journal. There is no conflict of interests regarding this investigation. We would of course be ready to provide further information about the data and methods you so desire.

Thank you very much for your kind attention. We look forward to hearing from you.

Sincerely,

Cristina Martínez

Cancer Prevention and Control Unit

Institut Català d'Oncologia

E-mail:cmartinez@iconcologia.net

Respuesta del editor y comentarios de los revisores de Cancer Nursing

Jul 12 2007 10:32AM

RE: CN-D-07-00035, entitled "Barriers and challenges for tobacco control in a Smoke-Free Hospital"

Dear Miss Martínez,

I am pleased to inform you that your paper has completed review and requires minimal revision. I anticipate that you will be able to respond to the reviewers' comments in a satisfactory manner. I will verify that this has been done upon receipt of the revised manuscript. Please find the comments of the reviewers listed below.

Please include with your revised submission an itemized, point-by-point response to the comments of the reviewers. The revisions should be completed by Oct 10 2007 12:00AM to avoid being considered as a new submission.

To submit a revision, go to http://cn.edmgr.com/ and log in as an Author. You will see a menu item called "Submission Needing Revision." Please click on this item to obtain your submission record and begin the revision process.

cmartinez
martnez356653

With Kind Regards,

Dr. Carol Reed Ash
Editor-in-Chief
CANCER NURSING: An International Journal for Cancer Care

Reviewer Comments:

General comments.

This is a very well-written article about a very important topic for health care providers.
As this is an oncology nursing journal, it would be appropriate to have a few sentences about the importance of tobacco control to cancer control.

For background, please include smoking rates for males and females in Spain earlier in the manuscript. Please describe Spain's position in relationship to support of the FCTC.

As this is an international journal, it would be appropriate to cite the tobacco control policy by the International Society of Nurses in Cancer Care which supports nurses as smoke-free role models.

Please include the response rate by profession

Use the abbreviation, the first time environmental tobacco smoke (ets) is used (rather than on page 6) and then follow-through.

Does the smoking area for employees still exist? Are there plans to remove this?

The authors need to address the most effective strategies to help smokers with quitting, including the use of pharmacotherapy and social support.

Specific suggestions:

Abstract:
Second paragraph, line 4. Please give exact percentages of smoking at baseline and in 2006.

Introduction
Page 1: 1st para, line 2, "The" health community… 1st para, line 4, is similar "to" the average 2nd para, line 7, discouraging "smoking:, 3rd para, line 7, give statistics for smoking among nurses

Page 3: 1st para: Please describe efforts to obtain the survey as well as information on institutional review board approval for the study.
2nd para: Please include any information on validity and reliability of the questionnaire.
3rd para: line 1, "asking the employees"

Page 4: Please provide more information about the variables included in the analysis (e.g. smoking consumption, attempts to quit). Please clarify how "occasional smoking" was determined

Page 6: 2nd para, line 2, please clarify this sentence

Page 8: 1st para, line 1, please reword, is this 5 percentage points?
1st para, line 5, please clarify that the time frame for this change in health care professionals in the US 2nd para, line 6: here smoke-free hospitals is in quotes, please be consistent throughout the manuscript.
4th para, please include lack of information on use of pharmacotherapy as well as lack of information about smoking within the health care provider's family home as limitations.

Table 1: Please include the details of smoking status by profession in this table.

Table 2: Please include sample size for each year.

Table 3: Please include sample size and break down by profession.

Table 4. Please clarify if any of these changes over time are statistically significant.

Respuesta al editor y a los revisores de Cancer Nursing

Dear Editor:

Please find enclosed the revised manuscript “Barriers and challenges for tobacco control in a Smoke-Free Hospital”.

We thank very much the useful reviewers’ comments that have helped us to improve the clarity of the manuscript. Our detailed response follows, indicating when necessary the changes introduced in the text.

We would appreciate your considering the revised manuscript for publication in “Cancer Nursing” as an Original Research Paper. All authors of the paper directly participated in the planning, execution, or analysis of the study and have read and approved the final version here submitted.

The article is original and it is not submitted anywhere other than your journal. We will of course be ready to provide further information about the data and methods you so desire. We will be pleased to transfer copyright to the Publisher in case of acceptance.

Thank you very much for your kind attention. I look forward to hearing from you.

Sincerely,

Cristina Martínez

RN, BA in Anthropology

Reviewer Comments:

A) General comments

1. As this is an oncology nursing journal, it would be appropriate to have a few sentences about the importance of tobacco control to cancer control.

As suggested by the reviewer we have added a sentence about the importance of tobacco control to prevent cancer see paragraph 2 in the introduction section.

"One of the most effective strategies to reduce the harm from smoking and prevent cancer, is introducing "smoke-free environment" policies".

2. For background, please include smoking rates for males and females in Spain earlier in the manuscript. Please describe Spain's position in relationship to support of the FCTC

We have included the smoking prevalence by sex according the last National Health Interview Survey in the introduction section.

"Spain, the 30.0% of population smokes. By gender, 35.8% of men and 24.3% of women are smokers. In the case of health professionals, among physicians the rates have decreased in the last decades and are lower than the general population, whereas among nurses it is still higher with 35.1% of them smokers" [introduction section paragraph 4]

In addition, we have incorporated a new paragraph that describes the Spanish position in relation to the FCTC.

"After the ratification of the Framework Convention on Tobacco Control (FCTC) on January 27th of 2005, a new law for Prevention and Control of Smoking has been implanted in Spain. Restrictions in selling, advertising and use of tobacco in public places, workplaces and hospitals have been established" [introduction section paragraph 3]

3. ***It would be appropriate to cite the tobacco control policy by the International Society of Nurses in Cancer Care which supports nurses as smoke-free role models.***

As suggested, we have added in the discussion section that the Society of Nurses in Cancer Care enhance nurses as role models in tobacco control.

"Some nursing associations, such as the International Society of Nurses in Cancer care, enhance nurses as role models in tobacco control. Following their recommendations, we enrolled nurses as an instrumental partner in our project because nurses are the largest health professional group (…)" [discursion section page 10 paragraph 3]

4. Please include the response rate by profession

Data were obtained from four cross-sectional surveys; we didn't know the profession distribution of our population before running the surveys. However, the overall response rate was extremely high (≥95%). The sample sizes were estimated taking into account the smoking prevalence among health care professionals in Catalonia in 1998 (35%) and assuming a 95% confidence level and an error ± 4. There were calculated using Statcalc in EpiInfo, version 6.0.4 (Centers for Disease Control and Prevention, Atlanta, USA).

We can affirm that the distribution of the 4 professional groups across this time has not changed. Thus, in 2006 17.3% were doctors, 46.6% were nurses, 14.1% administrative employees and 22.0% were other professionals (i.e., statisticians, technical assistants, informatics and so on)

5. Use the abbreviation, the first time environmental tobacco smoke (ets) is used (rather than on page 6) and then follow-through.

We have followed the indication, using the abbreviation "ets" across the whole manuscript.

6. Does the smoking area for employees still exist? Are there plans to remove this?

In the second paragraph of the discussion section is detailed explained how the hospital became progressively smoke-free. In July 2005 we ban smoke inside all the dependencies of the hospital, anticipating the law on tobacco control in Spain. So we don't have smoking areas.

7. The authors need to address the most effective strategies to help smokers with quitting, including the use of pharmacotherapy and social support.

We have added a sentence about the support activities that our hospital provides to smokers to quit in the discussion section.

"We have tried to implicate nurses and the rest of employees in promoting tobacco cessation using brief counseling and nicotine replacement therapy as effective strategies to help smokers to quit" [discursion section page 10 paragraph 3].

B) Specific suggestions

Abstract:

Second paragraph, line 4. Please give exact percentages of smoking at baseline and in 2006.

We included the exact percentages of smoking at baseline and in 2006.

Introduction:

Page 1

1st para, line 2, "The" health community… 1st para, line 4, is similar "to" the average 2nd para, line 7, discouraging "smoking:, 3rd para, line 7, give statistics for smoking among nurses

We have changed the grammatical mistakes detected by the reviewers and we have included the smoking prevalence among nurses in our country.

Page 3

1st para: Please describe efforts to obtain the survey as well as information on institutional review board approval for the study.

We have described who ran the survey, how we located each subject and the strategies used to locate them found in methods section. We have also included that we had the approval of the institutional board to run the survey.

2nd para: Please include any information on validity and reliability of the questionnaire.

In questionnaire and variables section we have specified that the questionnaire was design by a team from the European Network of Smoke-free Hospitals. As it mentioned no formal assessment of its psychometric proprieties has been carried out but its feasibility has been tested.

3rd para: line 1, "asking the employees"

We have corrected the typos.

Page 4:

Please provide more information about the variables included in the analysis (e.g. smoking consumption, attempts to quit). Please clarify how "occasional smoking" was determined

We consider that we have included information about the variables included in the survey in the methods section. We have indicated that we consider daily smokers those who smoke at least 1 cig/day and occasional smokers less 1cig/day.

Regarding the attempts to quit we asked to the employees how many serious attempts they have made to quit, as it is included in the text.

Moreover, we described how we evaluated the compliance with tobacco free policy applied in the hospital and the ETS (Environmental tobacco smoke exposure) in hours at worksite.

Page 6

2nd para, line 2, please clarify this sentence

We agree with the reviewer and we have reworded the text.

Page 8

1st para, line 1, please reword, is this 5 percentage points?

We are referring on percentage points as the reviewer has noticed; therefore we have changed the text to make it clear.

1st para, line 5, please clarify that the time frame for this change in health care professionals in the US 2nd para, line 6: here smoke-free hospitals is in quotes, please be consistent throughout the manuscript.

4th para, please include lack of information on use of pharmacotherapy as well as lack of information about smoking within the health care provider's family home as limitations.

We have incorporated a paragraph about interventions that are been implementing and and the therapy that we provide to smokers.

Tables

Table 1: Please include the details of smoking status by profession.
Table 2: Please include sample size for each year.
Table 3: Please include sample size and break down by profession.
We have updated the tables as suggested by the reviewers.

Table 4. Please clarify if any of these changes over time are statistically significant.
As suggested, we have indicated with an asterisk [*] in the table if is statistically significant.

Carta de decisión final de Cancer Nursing

Sep 12 2007 11:54AM

RE: CN-D-07-00035R1, entitled "Barriers and challenges for tobacco control in a Smoke-Free Hospital"

Dear Miss Martínez,

I am pleased to inform you that your work has now been accepted for publication in CANCER NURSING: An International Journal for Cancer Care. All manuscript materials will be forwarded to the production staff for placement in an upcoming issue.

Thank you for submitting your interesting and important work to the journal.

http://cn.edmgr.com/

cmartinez
martnez356653

With Kind Regards,

Dr. Carol Reed Ash
Editor-in-Chief
CANCER NURSING: An International Journal for Cancer Care

10.1.2. Correspondencia Artículo 2

Martínez C, Fu M, Martínez-Sánchez JM, Ballbè M, Puig M, García M, Carabasa E, Saltó E, Fernández E. Tobacco control policies in hospitals before and after the implementation of a national smoking ban in Catalonia, Spain. BMC Public Health. 2009; 28(9):160-166.

Carta de presentación del manuscrito a BMC Public Health

BMC Public Health

San Francisco, 28th December 2008

Dear Editor,

Please find enclosed the manuscript titled, "Tobacco control policies in hospitals before and after the implementation of a national smoking ban in Catalonia, Spain". In the manuscript, we discuss the progress made in tobacco control policies for the Catalan Network of Smoke-free Hospitals before and after a national smoking ban. We would appreciate your consideration of this manuscript for publication as an Original Research Paper in the BMC Public Health.

The authors of the manuscript were directly involved in the planning, analysis and writing of the paper, approve of the final version being submitted, and accept full responsibility for the content of the paper.

This is an original manuscript that has not been submitted to another journal for review. There are no conflicts of interest regarding this investigation. Please contact us if there are any questions or concerns regarding this manuscript.

We look forward to hearing from you.

Sincerely,

Cristina Martínez

Coordinator Nurse

Catalan Network of the Smoke-free Hospitals

E-mail:cmartinez@ucsf.edu / cmartinez2@gmail.com

Confirmación de envío a BMC Public Health

Article title: Tobacco control policies in hospitals before and after the implementation of a national smoking ban in Catalonia, Spain.

MS ID: 2308279312452226

Authors: Cristina Martínez, Marcela Fu, Jose M Martínez-Sánchez, Montse Ballbè, Montse Puig, Monste García, Esther Carabasa, Esteve Saltó and Esteve Fernández

Journal: BMC Public Health

Dear Ms Martínez

Thank you for submitting your article. This acknowledgement and any queries below are for the contact author. This e-mail has also been copied to each author on the paper, as well as the person submitting. Please bear in mind that all queries regarding the paper should be made through the contact author.

A pdf file has been generated from your submitted manuscript and figures. We would be most grateful if you could check this file and let us know if any aspect is missing or incorrect.

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Regards

The BioMed Central Editorial Team

Respuesta del Editor y Comentarios de los Revisores de BMC Public Health

Your manuscript has now been peer reviewed and the comments are accessible in PDF format from the links below. Do let us know if you have any problems opening the files.

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http://www.biomedcentral.com/imedia/5167584302511639_comment.pdf
Referee 1:
http://www.biomedcentral.com/imedia/4951962142477962_comment.pdf

We would be grateful if you could address the comments in a revised manuscript and provide a cover letter giving a point-by-point response to the concerns.

In addition, we have one editorial request to make of you:

1. Please include some contextual background information in the "Background" sub-section of your abstract, in addition to your aims.

Please also ensure that your revised manuscript conforms to the journal style (http://www.biomedcentral.com/info/ifora/medicine_journals). It is important that your files are correctly formatted.

We look forward to receiving your revised manuscript by 19 February 2009. If you imagine that it will take longer to prepare please give us some estimate of when we can expect it.

You should upload your cover letter and revised manuscript through http://www.biomedcentral.com/manuscript/login/man.asp?txt_nav=man&txt_man_id=2308279312452226. You will find more detailed instructions at the base of this email.

Please don't hesitate to contact me if you have any problems or questions regarding your manuscript.

With best wishes,

The BioMed Central Editorial Team

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Reviewer's report

Title: Tobacco control policies in hospitals before and after the implementation of
a national smoking ban in Catalonia, Spain.

Version: 1 **Date:** 12 January 2009

Reviewer: IRENE TRAMACERE

Reviewer's report:
The manuscript deals with an interesting issue, focusing on the effects of the implementation of the Smoke-free Hospitals Project in Spain, overall andaccording to selected hospitals' characteristics. The manuscript is well-writtenand conclusions are interesting. Below there are some minor points that may help to further improve the manuscript:

1. In the Methods section please provide further information on the Self-Audit Questionnaire, including the response rate in 2005 and in 2007.

2. In the last paragraph of the Results section please double check the estimate referred to the mean score of "education and training" of reference hospitals (17.5): the correct value is probably 7.5.

3. Please clarify whether p-values shown in the last paragraph of the Results section test differences between the two surveys (2005 and 2007) or among various strata of hospitals.

4. In the first paragraph of the Discussion section, authors stated that "the highest raises (not "raise", please correct) have been produced in those hospitals with initial worst situation". However, hospitals with low scores at baseline generally improve more than those with high scores, because of "regression towards the mean" (please consider Statistic Notes by Altman in BMJ, including Vickers and Altman 2001; BMJ 323:1123-1124). This should be discussed.

5. Please delete Figure 1, including findings in the Results section, only.

6. Tables have been submitted as "additional files", but they should be included in the article.

7. Please consider to categorize hospitals by tobacco prevalence in two or three categories (preferably tertiles), only.

8. Please replace ">0.05" with "NS" to avoid possible misunderstandings.

9. Please carefully re-read the entire manuscript, for the presence of few typos, including for example "moths" instead of "months" in the first paragraph of the Methods section. Moreover, "Self-Audit Questionnaire" should be replaced with its acronym (SAQ), after the first occurrence.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests: I declare that I have no competing interests.

Revisor 2

Title: Tobacco control policies in hospitals before and after the implementation of a national smoking ban in Catalonia, Spain.

Version: 1 **Date:** 27 January 2009

Reviewer: Ann O'Riordan

Reviewer's report:

Generally: I found this piece of work extremely interesting. The findings are important and will be useful to members of the European Network of Smoke-Free Hospitals and Health Service (ENSH) as the results are supportive of efforts to use the ENSH Self Audit Questionnaire as a tool to monitor tobacco policy implementation.

• Major Compulsory Revisions - No major compulsory revisions are required.
• Minor Essential Revisions

1) It is not clear if the data was dealt with as parametric or non-parametric. One assumes that by using the Wilcxon's test it was dealt with as non parametric. Clarification would be useful to support replication.

2) It is unclear the results section that the percentage increase found is based on the fact that 2005 was used as the base year.

3) In the methods section it is unclear how hospitals were defined as being at consolidation stage. Clarification of this definition would assist the readers understanding

4) Word and sentence structure changes to add readability:
a) Methods Section – p5 Second paragraph last sentence. Suggested
rephrasing: We gave participating hospitals four weeks to complete the questionnaire by
group consensus and submit the results.
b) Discussion Section – Suggested word changes p9 First paragraph : 5th Sentence - --- Adscription (meaning unclear) … ?? participation. 2nd last sentence - Trajectory .. ?? participation in the Smoke Free Network
p10 1st sentence .. and that observed in the subsequent year..
c) Authors' Contributions - CMM (confectioned) suggested change to: conceived/ proposed/ envisaged ???

• Discretionary Revisions

1) Sample size is small for a quantitative study. This could be acknowledged within the limitations of the study with the discussion section and further referred
to in the conclusion as a recommendation that the study should be replicated either on a national basis within Spain or as cross Europe study.
2) Probability – it is unclear how the probability level is ascertained in relation to the percentage found.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests: 'I declare that I have no competing interests'

Respuesta al Editor y a los revisores de BMC Public Health

BioMedCentral Public Health

MS: 2308279312452226. ***Tobacco control policies in hospitals before and after the implementation of the national smoking ban in Catalonia, Spain.***

Dear Editor,

Thank you very much for accepting our manuscript in BioMedCentral Public Health. We are pleased to know that the results of the evaluation of the tobacco control policies in Catalonia are going to be published in your journal.

Besides, we have included in this last version the web site source of the reference 11. However, because this reference is a law we have not endowed journal, volume or pages. In addition, we have changed the heading of Annex 1 by Figure 1 and included its labelling at the end of the reference list.

Finally, we inform you that we are going to proceed soon to make the payment of the manuscript. Nevertheless, it is worth mentioning that one of the authors – Dr. Esteve Fernández- is a reviewer of your journal. For that reason, we would like that you consider a discount on the required payment.

Thank you very much again for your kind attention and valuable time.

With best regards,

Cristina Martínez, RN

Please find enclosed our response to the useful reviewers' comments. We have responded point-by-point as suggested, indicating when necessary the changes introduced in the manuscript.

Editorial request:

Please include some contextual background information in the "Background" sub-section of your abstract, in addition to your aims

As suggested by the editor we have expanded the "Background section" of the abstract to provide some contextual background.

"Diverse projects and guidelines to assist hospitals towards the attainment of comprehensive smoke-free policies have been developed. In 2006, the Spanish government passed a new smoking ban that reinforce tobacco control policies and banned completely smoking in hospitals. This study assesses the progression of tobacco control policies in the Catalan Network of Smoke-free Hospitals before and after a comprehensive national smoking ban."

Reviewer: 1

1. In the Methods section please provide further information on the Self-Audit Questionnaire, including the response rate in 2005 and in 2007.

We have provided more details on the SAQ and propose to include it as an Annex to the paper. This could, besides improving the understanding by the readers, facilitate its diffusion and use by other researchers.

"The degree of implementation of the Smoke-free Hospitals Project was analysed by means of the Self-Audit Questionnaire (SAQ) of the European Network for Smoke-free Hospitals. The SAQ enables hospitals to monitor and review their own progress towards the achievement of a written smoke-free policy that ensures the attainment of a totally smoke-free environment. The SAQ is also a tool to acknowledge and reward continuous improvement by facilitating hospitals to categorize their progress. This instrument was developed to analyse the extent to which tobacco control measures are complied within hospitals [5]. The questionnaire includes 9 standards (see Annex 1) with different number of items:"

We have added it at the end of the same paragraph. We have included further details about the collection of data. The participation of hospitals was complete, this is, 100% response rate.

"We gave participating hospitals four weeks to complete the questionnaire by group consensus and submit the results. The response rate was 100% both in 2005 and 2007."

In addition, we have provide some information about the number of hospitals enrolled to the Catalan Network in 2005, and the among of them that were in consolidation stage (Methods, first paragraph).

2. In the last paragraph of the Results section please double check the estimate referred to the mean score of "education and training" of reference hospitals (17.5): the correct value is probably 7.5.

As pointed out the data is not corrected and has been modified.

3. Please clarify whether p-values shown in the last paragraph of the Results section test differences between the two surveys (2005 and 2007) or among various strata of hospitals.

The comparison detailed in this paragraph refers to the levels of hospitals. We have reworded the paragraph to clarify it:

"Comparing the results by level of hospitals, we observed a particular situation after the appliance of the tobacco control law, in the results obtained in "education and training" and "identification and cessation support".

4. In the first paragraph of the Discussion section, authors stated that "the highest raises (not "raise", please correct) have been produced in those hospitals with initial worst situation". However, hospitals with low scores at baseline generally improve more than those with high scores, because of "regression towards the mean" (please consider Statistic Notes by Altman in BMJ, including Vickers and Altman 2001; BMJ 323:1123-1124). This should be discussed.

We have edited the grammar mistake as detected by the reviewer.

Besides, we appreciate the comment about the potential "regression towards the mean" effect in the data. However, we believe that in our observational study the likelihood of this phenomenon is low. First, we are not in a situation of comparing an outcome between two groups, as in a randomized clinical trial. We observe the (composite) scores to a self-audit questionnaire in the same hospitals in two different points of time. Second, we calculated the increases in score relative to the baseline values. If regression to the mean was present here, relative increases of hospitals with higher scores would be even negative, and in all but 4 cases the 2007 scores were higher than 2005 scores. Hence, we are inclined to clarify it in the Discussion section as follows:

"In terms of growth we observed that the highest raises have been produced in those hospitals with an initial worst situation. This could be partly explained by regression towards the mean [16]. However, the increase in SAQ scores was generalized in all hospitals except in four of them (those with the highest scores pre-ban). Hospitals with a shorter enrollment in the Smoke-free Network have achieved similar scores than hospitals with more years in the Network after the enforcing of the ban."

5. Please delete Figure 1, including findings in the Results section, only.

As suggested we have deleted figure 1. However, we consider that the place to include these results is the Discussion section. These results are presented to discuss the potential limitation that the observed increase would be nothing that the natural trend to increase.Hence, we are inclined to maintain the reference to the SAQ in the previous and next year in the Discussion (but find not necessary the figure and hence have removed it).

6. Tables have been submitted as "additional files", but they should be included

in the article.

We are sorry for this mistake and now the table is submitted with the manuscript.

7. Please consider to categorize hospitals by tobacco prevalence in two or three categories (preferably tertiles), only.

We have not computed the data in two or three categories because we consider that there is huge difference among the percentage of consumption in the different hospitals. Clustering the data will minimize the striking difference among tobacco consumption in hospitals.

8. Please replace ">0.05" with "NS" to avoid possible misunderstandings.

As suggested by the reviewer we have replaced p>0.05 by NS

9. Please carefully re-read the entire manuscript, for the presence of few typos, including for example "moths" instead of "months" in the first paragraph of the Methods section. Moreover, "Self-Audit Questionnaire" should be replaced with its acronym (SAQ), after the first occurrence.

A carefully review of the manuscript have been done to avoid typos and other mistakes.

Reviewer: 2

***Minor Essential Revisions**

1) It is not clear if the data was dealt with as parametric or non-parametric. One assumes that by using the Wilcoxon's test it was dealt with as non parametric.

Clarification would be useful to support replication.

We have included in the methods section a clarification about the Wilconxon test. We pointed out that Wilcoxon test is a non-parametric test (repeated measurements on a single sample).

"We used Wilcoxon signed-rank non-parametric test to compare the SAQ scores of hospitals before and after the implementation of the smoking ban."

2) It is unclear the results section that the percentage increase found is based on the fact that 2005 was used as the base year.

We have added in the text a note to clarify the baseline measurement (see below in highlight the modification)

"The overall mean of implementation score of tobacco control policies was 52.4 (95% CI: 45.4-59.5) in 2005 and 71.6 (95% CI: 67.0-76.2) in 2007, with an increase from the baseline results obtained in 2005 of 36.7% ($p<0.01$) (Table 1)."

3) In the methods section it is unclear how hospitals were defined as being at consolidation stage. Clarification of this definition would assist the readers understanding

The criterion definition of hospitals at consolidation stage has been included. In addition, we have added the overall number of hospitals that were members in 2005.

"We conducted two independent cross-sectional surveys to monitor tobacco control policies in hospitals members of the Catalan Network of Smoke-free Hospitals at consolidation stage. We defined as consolidation stage those hospitals with two or more years of enrollment after the official launching of the project [5] in 2005. From the 43 members of the Network in 2005, 32 (74.4%) satisfied this criterion, and were included in the study. The baseline survey was run in April 2005, six months before implementing the law, and the second one a year and four months after its implementation in April 200

4) Word and sentence structure changes to add readability:

a) Methods Section – p5 Second paragraph last sentence. Suggested rephrasing:

We gave participating hospitals four weeks to complete the questionnaire by group consensus and submit the results.

b) Discussion Section – Suggested word changes

p9 First paragraph : 5th Sentence - --- Adscription (meaning unclear) … ??participation. 2nd last sentence - Trajectory .. ?? participation in the Smoke Free

Network

p10 1st sentence .. and that observed in the subsequent year..

c) Authors' Contributions - CMM (confectioned) suggested change to: conceived/ proposed/ envisaged ???

We appreciate very much the corrections suggested in the sentence structures, and we have made the corresponding changes to improve the manuscript.

***Discretionary Revisions**

1) Sample size is small for a quantitative study. This could be acknowledged within the limitations of the study with the discussion section and further referred to in the conclusion as a recommendation that the study should be replicated either on a national basis within Spain or as cross Europe study.

Although the number of hospitals is small, it represents all the hospitals at the consolidation stage of the Catalan Network. It is worth mentioning that 74.4% of the hospitals enrolled to this project were in this stage. However, the paired nature of the data precludes lack of statistical power, as shown by the fact that most comparisons were significant at the 0.05 alpha level.

Please note that the study aim was to assess the progress of smoke-free policies in the hospitals of Catalonia after a national ban. Hence, a recommendation to conduct such a study at the European level had to be linked with similar measures in other countries. Although we agree with the reviewer that a larger study would have been better and that replication is also desirable, this conclusion is out of the scope of the study objectives.

2) Probability – it is unclear how the probability level is ascertained in relation to the percentage found.

There was an error in the Results section when presenting the results according to some selected variables (ie, reference vs high technology hospitals). There was an erroneous p-value after the first %. The error has been corrected (please see text).

We appreciate the comment about the potential "regression towards the mean" effect in the data. However, we believe that in our observational study the likelihood this phenomenon is low. First, we are not in a situation of comparing an outcome between two groups, as in a randomized clinical trial. We observe the (composite) scores to a self-audit questionnaire in the same hospitals in two different points of time. Second, we calculated the increases in score relative to the baseline values. If regression to the mean was preent here, relative increases of hospitals with higher scores would be even negative, and in all but 4 cases the 2007 scores were higher than 2005 scores. Hence, we are inclined to clarify it in the Discussion section as follows:

"In terms of growth we observed that the highest raises have been produced in those hospitals with an initial worst situation. This could be partly explained by regression towards the mean (REF: Bland & Altman). However, the increase in SAQ scores was generalized in all hospitals except in four of them (those with the highest scores pre-ban). Hospitals with a shorter enrollment in the Smoke-free Network have achieved similar scores than hospitals with more years in the Network after the enforcing of the ban". *Bland JM, Altman DG. Regression towards the mean. BMJ. 1994; 308: 1499*

Respuesta autómática de recepción de la versión revisada a BMC Public Health

The files for your revised manuscript have been received by BMC Public Health. You will shortly receive a further e-mail that will provide you with links to the PDF that is now being generated and will be used for assessing it and, if appropriate, for further peer review. At any time, you may log in to My BioMed Central (http://www.biomedcentral.com/my/) to view the status of the manuscript, or you can bookmark the URL of your manuscript:

http://www.biomedcentral.com/manuscript/login/man.asp?txt_nav=man&txt_man_id=2308279312452226

If you have any questions, please visit the BioMed Central Support Center (http://www.biomedcentral.com/support/) or e-mail us at editorial@biomedcentral.com.

Regards

The BioMed Central Editorial Team

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Respuesta del EditorBMC Public Health

Authors: Cristina Martínez, Marcela Fu, Jose M Martínez-Sánchez, Montse Ballbè, Montse Puig, Monste García, Esther Carabasa, Esteve Saltó and Esteve Fernández
Title: Tobacco control policies in hospitals before and after the implementation of a national smoking ban in Catalonia, Spain.

Journal: BMC Public Health
MS: 2308279312452226

Dear Ms Martínez,

Peer review of your manuscript (above) is now complete, and we are delighted, in principle, to accept the manuscript for publication in BMC Public Health. The reviews are accessible in PDF format via the web links provided at the bottom of this email. Do let us know if you have any problems opening the files.

However before acceptance, our editorial production team needs to check the format of your manuscript, to ensure that it conforms to the standards of the journal. They will get in touch with you shortly to request any necessary changes or to confirm that none are needed.

If you have any problems or questions regarding your manuscript, please do get in touch.

Sincerely,

The BioMed Central Editorial Team
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e-mail: editorial@biomedcentral.com

Decisión final del editor de BMC Public Health

MS: 2308279312452226
Title: Tobacco control policies in hospitals before and after the implementation of a national smoking ban in Catalonia, Spain.
BMC Public Health 2009, 9:160

Dear Ms Martínez,

We confirm receipt of the online credit card payment for the above article processing charge. A receipt will be sent within 24 hours to the card holder's email address (cmartinez2@gmail.com).

We are delighted to confirm that your manuscript is now formally accepted, and has been published in preliminary form on our website at the following page: http://www.biomedcentral.com/1471-2458/9/160 Your article's citation is as follows: BMC Public Health 2009, 9:160.

The abstract of your article has been sent to the US National Library of Medicine for inclusion in PubMed, where it should be available within 2-3 working days.
The full text version of your article (also known as the web or HTML version) will be ready for you to check in about a week. We will ask you to look at it to ensure that no errors were introduced in the process of converting the provisional PDF to the full text version.

We will then ask you to return any corrections within two days. You can detail them in an e-mail, or mark up a printout of the article and fax it to the number below. As you know, the proofing stage was when you submitted the final version. At this point, we will not make any copyediting or proofing changes.

Please be aware that delays on your part in returning your corrections will hold up production of the final version of the article. If you will not be available to check the full text version in a week's time please let us know the name and e-mail address of a colleague who could do this in your absence.

On receipt of any corrections, we will make the required changes and give you the opportunity to confirm them. We will then prepare a fully formatted PDF version of the article. Subsequently the full text and final PDF versions of the article will replace the "Provisional PDF" on our website.

Please do not hesitate to contact the editorial team if you have any questions. We will contact you with the full text version of your manuscript for you to check.

With best wishes, The BioMed Central Editorial Production Team

10.1.3 Correspondencia Artículo 3

Fernández E, Fu M, Martínez C, Saltó E, Martínez JM. Secondhand smoke in hospitals before and after a ban on smoking in Catalonia (Spain). Prev Med.2009; 47(6) 624-628.

Carta al Editor de presentación del manuscrio a Preventive Medicine

Barcelona, December 14th, 2007

Dear Editor:

Please find enclosed our manuscript "Secondhand smoke in hospitals before and after a ban on smoking in Catalonia (Spain)" for your consideration in Preventive Medicine as a "Brief Report". In this paper we aimed at evaluating the impact of the new law in public hospitals in Spain, by measuring the concentrations of airborne nicotine before (2005) and after (2006) the law came into force.

The data show that before the law the compliance with smoking bans in hospital facilities in Catalonia was good but not complete. After the complete ban for health care centers, nicotine levels have decreased in hospitals but there is room for improvement in some specific areas, such as the main entrance, fire escapes, emergency department waiting rooms, and cafeterias. The study also shows that the assessment of airborne nicotine concentrations is a reliable and effective system to monitor smoke-free legislations.

This is the first study to systematically assess airborne nicotine concentrations (the main and more specific tobacco exposure marker) in a large number of hospitals (n=44) before and after a comprehensive law on smoking. Previous studies in other countries were of cross-sectional design, not linked to changes in legislation, and assessed nicotine concentrations in a few hospitals. We believe these results are of interest for an international audience given the quick development of anti-smoking legislation both in developed and developing countries.

All the authors carefully read the manuscript and fully approve of it. In their name I also declare that the manuscript is original and it is not submitted anywhere other than your journal. We would of course be ready to provide further information about our data and methods you so
desire.

Correspondence about the manuscript should be addressed to myself as indicated in the first page of the manuscript. Thank you very much for your kind attention. We look forward to hearing from you.
Yours sincerely,

Esteve Fernandez, MD, PhD
Head, Tobacco Control Research Unit, Institut Català d'Oncologia
Assistant Professor, Master of Public Health, Universitat Pompeu Fabra
E-mail: efernandez@ico.scs.es

Respuesta del editor y revisores de Preventive Medicine

Ms. No.: PM-08-190
Title: Secondhand smoke in hospitals before and after a ban on smoking in Catalonia (Spain)

Dear Dr. Fernandez,

Your manuscript, referenced above, has been reviewed. We are interested in the content of the paper. Besides the comments of the reviewers it may be useful for the reader if you could translate the nicotine concentration to a smoking prevalence or at least to a proxy measure of a smoking prevalence (e.g. 10 µg/m3 is generated by X cigarettes smoked in a space of Ym3). The conclusion should further discuss the public health relevance of the method (e.g. should public health agencies invest in the described monitoring system compared to other methods of smoke ban policy evaluation).

We therefore invite you to revise and resubmit the manuscript along the above lines and those suggested by the reviewers for further consideration in Preventive Medicine. The reviewer comments are below. Please also verify the references and reference list as there are some errors in the names of the authors.

Please submit your revision online within 90 days by logging onto the Elsevier Editorial System for Preventive Medicine: http://ees.elsevier.com/pm/

You may find the manuscript record listed under "Submissions Needing Revisions." Click "Revise" when you are ready to submit your revision. (If you have forgotten your password, please click the "Forget your password" link located on the log-in screen).

When submitting your revised paper, please include a separate document uploaded as "Response to Review" that carefully addresses the issues raised in the comments below, point by point. You should also include a suitable rebuttal to any specific request for change that has not been made.

To facilitate the electronic publication of your manuscript (should it be accepted), we request that your manuscript text, tables and figure legend be submitted in an editable format (Word, WordPerfect, or LaTex only), and all figures should be uploaded individually as TIF or EPS files.

Thank you, and we look forward to receiving your revised manuscript.

With kind regards,
Alfredo Morabia, MD, PhD. Editor-in-Chief

Reviewers' comments:

Reviewer #2: The objective of the study is to evaluate changes in airborne nicotine concentrations as an atmospheric marker of secondhand smoke in two periods before and after the introduction of a national comprehensive smoking ban. This is an important topic and potentially useful for policy-making within Spain as well as other countries. It is well written and easy to read.

Major comments:

The authors, as indicated at the end of the introduction, try to evaluate the impact of the comprehensive tobacco law in Spain on exposure to environmental tobacco smoke in public hospitals of Catalonia. The conclusión is that the concentration of airborne nicotine has declined after the law came into effect. Although the results show a consistent fall of airborne nicotine in all samples, the quantity of exposure was very low before the law. We must keep in mind that this can reflect a descending trend prior to the law. Hence it is a cross-sectional study based only on two measurements and it cannot be ruled out that this decrease came before the law. At least, if the measurements had been carried out immediately when the law came into force (first quarter of 2006) the change between the two estimations could be attributed more consistently to the effect of the law. It is reasonable to think about a descending trend prior to the law: 1) Previous regulation
prohibited smoke in all areas except in cafeterias (variable among hospitals according to
type of regulation) 2) these hospitals were submitted to an intervention program for tobacco control integrated in a network of smoke-free hospitals 3) Since the year 2000 the prevalence of tobacco consumption in Spain was declining in general population and at a faster rate among health personnel. For these reasons the results cannot be attributed clearly to the effect of the new law. On the other hand, the authors could have carried out
measurements in 17 hospitals not integrated into the network. The comparison of the evolution in both groups would have permitted a better estimate of the effect of the new regulation. Therefore I consider that this important limitation should be taken into account and deeply argued in the discussion section.

Minor comments:

Title: Given that some regulations had been developed prior to the comprehensive ban I would modify the title by: Seconhand smoke in hospitals of Catalonia (Spain) before and after a comprehensive ban on smoking at nacional level.

Methods:
Design and population: The authors should justify the selection of the locations of sampling devices. Have they been prioritized to be representative of general exposure (workers and users) or have been prioritized focusing in users? For example, it is surprising that offices or administration areas have not been sampled.

Nicotine assessment: The authors said that the limit of quantification is 5ng nicotine in filter. It would be more useful to show this value in µg/m3 or in both units. Samples with nicotine concentrations below the quantification limit were assigned a value of 0.02 µg/m3. Why? To do logarithmic transformation of the data? Why this value and not a lower one?

Discussion:
In the end of the first paragraph of page 7 [., the median concentrations..., where smoking may be allowed in some areas within hospitals], should be included the reference.

In order to avoid completely the exposure to second hand smoke in hospitals the authors could develop some recommendations. In this sense, for example, is it possible that the source of nicotine concentrations detected in waiting room of ER or fire escapes come from tobacco consumption outside and the smoke goes inside by air flow?. In this case, given that outside smoke is allowed, the recommendation would be to isolate the waiting room from the outside air.

Reviewer #3: 1. Abstract - conclusions - The statement "Measurement of airborne.is a reliable system .in hospitals" is no where mentioned as a focus of this study and should really be removed. Perhaps should add as aconclusion: "The new smokefree law was well-complied with by both patients and staff of the hospitals."

2. Introduction - The intro is a bit light. Perhaps more information should be given on the following: (a) what the smoking prevalence is, by gender; and (b) what practical guidance on implementation was provided by the Catalan Network for Smokefree Hospitals.

3. Introduction - Also, some of the materials in the Discussion are more appropriate for the Intro or at least should be introduced in the Intro rather than mentioned for the first time in the Discussion. For example, on page 6 paragraph 2 of the Discussion, the sentences starting "Previous studies have analysed SHS .. Another cross-sectional survey conducted in China.and 2.21 ug/m3" can be moved to the intro. In the third paragraph of the Discussion, starting from "One of the pioneering experiences.Valente e al., 2007)" this could also be moved to the Intro.

4. Introduction - last paragraph of Intro, add right after "the new law" the following: "on SHS exposure".

5. Methods - Design and Population - p4, line 14, replace "during" with "for" so that the sentence reads "The devices were installed for 7 days.."

6. Results - line 2, correct "universitary" to "university".

7. Results - Any differences in median nicotine concentrations at baseline and follow-up by types of hospitals, ie., county, reference and university hospitals?

8. Discussion - For the main findings, need to offer an interpretation of the main findings, that is, that the decline in nicotine levels suggests that the new law was well-complied with by both patients and staff of the hospitals. Also, need to offer possible contributing factors to the success of the smokefree law. For example, practical guidance provided by the Catalan Network might be one success factor. Were there any media campaigns surrounding the introduction of the new law or education campaign to educate
the public? What about enforcement and monitoring of the law?

9. Discussion - need to discuss findings in terms of broader implications for policy development in relation to FCTC. Can the same positive outcomes be expected or achieved in other public places?

10. Discussion - limitations of the study - first line, correct "voluntary" with "voluntarily". 11. Discussion - p8, second paragraph, correct "were" to "where" so that
the sentence reads "A number of lost devices occurred in places where high ..."
12. Discussion - strength of the study - line 4, add "the" so that the sentence reads "this is the first study in hospitals."

13. Conclusions - p8, replace "as" to "to be" so that the sentence reads ”nicotine concentrations appears to be a reliable and effective system.."

14. Table 1 & Fig 1 - title stated that the period of measurement was from October-December for both before and after the ban whereas elsewhere, in abstract and Methods (p 4) the period was from September-December. Please correct accordingly.

Reviewer #4: The reviewed manuscript is well structured, and it presents to the readers clear information on the tasks of the study, methods used and analysis of data collected. Discussion is relevant to the results obtained. Conclusions reflect findings of the study and argue for the possibility how to effectively monitor the smoke-free environment in health care settings.

Primera respuesta al editor y revisores de Preventive Medicine

PM-08-190

Secondhand smoke in hospitals before and after a ban on smoking in Catalonia (Spain)

Response to Reviewers' comments

We thank the useful editors' and reviewers' comments and include them with the corresponding answers, indicating when necessary the modifications introduced in the manuscript.

Editorial team

Besides the comments of the reviewers it may be useful for the reader if you could translate the nicotine concentration to a smoking prevalence or at least to a proxy measure of a smoking prevalence (e.g. 10 µg/m3 is generated by X cigarettes smoked in a space of Ym3).

This is a very interesting point but at the same time it is complicated to incorporate it in the manuscript. Hammond (1993) has provided some formulae to translate airborne nicotine concentrations to concentrations of exposure to some carcinogenic compounds of tobacco, such as NDMA (4-nitrosodimethylamine), that can be translated into equivalent cigarettes smoked. Thus, a person inhaling during one week the average nicotine concentration of airborne nicotine found in hospitals (0.23 µg/m^3) would have an intake of NDMA equivalent to that of actively smoking 0.6 cigarettes/day.

Following your suggestion, we have added a sentence in the Discussion section (end of second paragraph) to comment it:

«Although not very high, these nicotine concentrations represent a hazard of exposure to different carcinogens: a person inhaling during one week the average nicotine concentration of airborne nicotine found in hospitals before the law (0.23 µg/m^3) would have an intake of 4-nitrosodimethylamine equivalent to that of actively smoking 0.6 cigarettes per day (Hammond, 1993).»

Hammond K. Evaluating exposure to environmental tobacco smoke. Sampling and analysis of airbone pollutants. New York: Lewish; 1993. p. 319-37.

The conclusion should further discuss the public health relevance of the method (e.g. should public health agencies invest in the described monitoring system compared to other methods of smoke ban policy evaluation).

We agree with the editor to further discuss the public health relevance. Hence, we have expanded the conclusive sentences:

«Assessment of airborne nicotine concentrations appears to be an objective and feasible system to monitor and reinforce the compliance of smoke-free legislations in this setting. These objective measurements that complement other monitoring methods such as self-audit instruments or visual inspection of locations can easily be adopted by the corresponding public health or hospital authorities.»

Please also verify the references and reference list as there are some errors in the names of the authors.

References' format and erros have been corrected.

Reviewer #2

Major comments:

It is reasonable to think about a descending trend prior to the law: 1) Previous regulation prohibited smoke in all areas except in cafeterias (variable among hospitals according to type of regulation). 2) these hospitals were submitted to an intervention program for tobacco control integrated in a network of smoke-free hospitals. 3) Since the year 2000 the prevalence of tobacco consumption in Spain was declining in general population and at a faster rate among health personnel. For these reasons the results cannot be attributed clearly to the effect of the new law.

We partly agree with the reviewer that part of the effect observed would be attributable to the "smoke-free hospital" intervention (pertaining to the Network) rather than to the new national law. In the 2005 baseline nicotine measurements we included 44 public hospitals (39 hospitals pertaining to the Network for more than one year and 5 in negotiations during 2005). We did not measure nicotine in the other 17 hospitals (non-members) because of logistic (economic) reasons. In 2006 after the law, we were able to measure nicotine in all the hospitals (44+17) but we did not include the information from the non-members because we did not have the pre-ban data and we decided *a priori* to do a paired analysis (with the same hospitals before and after the law).

We have now analysed the 44 participating hospitals according to the time of membership to the Network, and the results show that besides a similar nicotine concentration pre-ban (median 0.23 μg/m^3, with small differences in the IQR) the decline in the 39 hospitals with a longer duration of affiliation (>1 year) was higher (-65.2%, postban median of 0.08) than in the 5 hospitals with shorter affiliation (-17.3%, post-ban median of 0.19). Hence, the "net" effect of the new legislation is lesser than the 56.6% reduction observed, since the effect of the ban is partly moduled by pertaining or not to the Network. We believe that this clarification can be introduced in the Discussion section (2nd paragraph):

« A comparison between hospitals according to the time of membership to the Network of Smoke-free Hospitals showed a greater decrease in airborne nicotine concentrations (65.2%) in the 39 hospitals affiliated more than 1 year than those 5 hospitals affiliated for less than one year at the time of baseline measurements. Hence, all the reduction in the airborne nicotine concentrations after the law is not only attributable to the law itself, but also related in part to previous Network affiliation. It is plausible that hospitals affiliated for longer were more prepared to face up the new regulation. The health policies and interventions proposed by the Network (Martinez et al., 2008) may be of help for a more effective compliance of the law, giving more resources to staff and patients for prevention and cessation. »

Minor comments:

Title: Given that some regulations had been developed prior to the comprehensive ban I would modify the title by: Seconhand smoke in hospitals of Catalonia (Spain) before and after a comprehensive ban on smoking at national level.

The title has been changed according to the reviewer's suggestion.

Methods. Design and population: The authors should justify the selection of the locations of sampling devices. Have they been prioritized to be representative of general exposure (workers and users) or have been prioritized focusing in users? For example, it is surprising that offices or administration areas have not been sampled.

We decided the locations of sampling devices according to a previous study (López et al., 2004; Nebot et al, 2005) taking into account both hospital workers and users perpectives but also logistic trying to be cost-effective. We

decided to sample all the hospitals in the Network and this implicated to have less devices in each hospital. In other studies, the authors have preferred to over-sample with 20 or 25 devices in a smaller number of hospitals. For example, Navas-Acien et al (2004) included only one hospital in each country. We agree that knowing airborne nicotine concentrations in some other areas would have been of interest, but we had resources for only 5-7 devices per hospital and we favored to have the same locations in each hospitals. We have added these details in the Methods section (first paragraph):

The number of sampling devices (…) devices in hospitals <100 beds). «Sampling devices were installed by a trained researcher in public and staff locations common for all the hospitals that covered:» cafeterias (registering in 2005 whether smoking was totally permitted, totally prohibited or whether cafeterias had smoking areas), staff dressing room (surgical area), general surgery and general medicine hospitalization units (corridor), fire escapes (top floor), emergency department waiting room, and main entrance hall, «accordingly to previous studies (Lopez et al., 2004; Nebot et al., 2005).»

Methods. Nicotine assessment: The authors said that the limit of quantification is 5ng nicotine in filter. It would be more useful to show this value in µg/m3 or in both units.

A new sentence has been added to further clarify this point (nicotine assessment paragraph):

(limit of quantification: 5 ng of nicotine in filter, «equivalent to 0.02 µg/m^3 per an exposition time of one week) » as in previous studies (Nebot et al., 2005)

Methods. Nicotine assessment: Samples with nicotine concentrations below the quantification limit were assigned a value of 0.02 µg/m3. Why? To do logarithmic transformation of the data? Why this value and not a lower one?

The value actually assigned was 0.01 µg/m^3, there was a mistake in the previous version. In these cases (values below the limit of quantification) the standard procedure is to assign a value half of this limit. We have clarified it at the beginning of the "nicotine assessment" paragraph within Methods:

Samples with values below the limit of quantification were assigned a value of «0.01 µg/m^3 (half of the limit of quantification)», …

Discussion: In the end of the first paragraph of page 7 [., the median concentrations..., where smoking may be allowed in some areas within hospitals], should be included the reference.

Done.

In order to avoid completely the exposure to second hand smoke in hospitals the authors could develop some recommendations.

We have expanded the 4th paragraph in the "main findings" heading of the Discussion section as follows:

The new Spanish law does not allow smoking rooms or designated areas within hospitals, and consequently the overall nicotine concentrations decreased after the ban, as shown by this study. Since 1992, the US Joint Commission on Accreditation of Health Care Organizations has required that accredited hospitals be totally smoke-free (Joint Commission on Accreditation of Healthcare Organizations, 1991). «The concept of "smoke-free hospital" should be expanded to its surrounding non-enclosed areas (i.e., campus, outside halls or terraces, entrances, and outdoor fire escapes).»

Reviewer #3

1. Abstract - conclusions - The statement "Measurement of airborne is a reliable system ..in hospitals" is no where mentioned as a focus of this study and should really be removed.

While the study is not completely oriented to evaluate the reliability of the method, a conclusion indicating the feasibility of the method can be derived from the study. Moreover, we also take into account the Editor's commnent (see above) that this conclusion should be further developed. Hence, we are inclined to slightly change the former conclusion in the Abstract as follows:

«Assessment of airborne nicotine concentrations appears to be an objective and feasible system to monitor and reinforce the compliance of smoke-free legislations in this setting.»

2. Introduction - The intro is a bit light. Perhaps more information should be given on the following: (a) what the smoking prevalence is, by gender; and (b) what practical guidance on implementation was provided by the Catalan Network for Smokefree Hospitals.

According to the reviewer's comment we have expanded the Introduction with a brief description of the Network goals (3rd paragraph) but have opted not to lengthen it with details about the prevalence of smoking in the hospitals:

«The Network assists hospitals in the implementation of tobacco control policies and provides continuous counseling to become a smoke-free hospital. The main areas of action concern assuring the compliance of the norm, providing tobacco control training, designing and applying cessation programs addressed to professionals, patients and visitors, and guaranteeing common follow-up and evaluation (Garcia et al., 2006; Martinez et al., 2008).»

3. Introduction - Also, some of the materials in the Discussion are more appropriate for the Intro or at least should be introduced in the Intro rather than mentioned for the first time in the Discussion. For example, on page 6 paragraph 2 of the Discussion, the sentences starting "Previous studies have analysed SHS .. Another cross-sectional survey conducted in China..and 2.21 ug/m3" can be moved to the intro. In the third paragraph of the Discussion, starting from "One of the pioneering experiences.Valente et al., 2007)" this could also be moved to the Intro.

We partly agree with the reviewer that some of the details provided in the Discussion should be included in the Introduction, to be further developed in our opinion in the Discussion section. Thus, we have added a new paragraph within the Introduction.

«Previous studies have evaluated SHS exposure using self-reported surveys or markers such as airborne nicotine in hospitals (Lopez et al., 2004; Navas-Acien et al., 2004; Nebot et al., 2005; Stillman et al., 2007; Martinez et al., 2008) and a few have used airborne nicotine to evaluate tobacco control policies in this setting (Becker et al., 1989; Stillman et al., 1990). However, there are not systematic assesments of secondhand smoke (SHS) in hospitals after a comprehensive tobacco control law. »

4. Introduction - last paragraph of Intro, add right after "the new law" the following: "on SHS exposure".

We have re-worded the study objective as follows:

«This study evaluates the impact of the new law on SHS exposure in public hospitals in Catalonia, Spain, by assessing concentrations of airborne nicotine before (2005) and after (2006) the national law came into force.»

5. Methods - Design and Population - p4, line 14, replace "during" with "for" so that the sentence reads "The devices were installed for 7 days.."

Done.

6. Results - line 2, correct "universitary" to "university".

Done.

7. Results - Any differences in median nicotine concentrations at baseline and follow-up by types of hospitals, ie., county, reference and university hospitals?

As noted by the reviewer, we forgot to include the fact that there were no differences according to the type of hospital. We have re-written the third sentence in the second paragraph of the Results section:

«We found no differences in the median nicotine concentrations at baseline and follow-up according to the type (county, reference or university) or size of the hospital (number of beds and number of workers) (data not shown).»

8. Discussion - For the main findings, need to offer an interpretation of the main findings, that is, that the decline in nicotine levels suggests that the new law was well-complied with by both patients and staff of the hospitals.

We have added a sentence following the reviewer's advice (first paragraph under the "main finding" heading in the Discussion):

«Hence, the new law boosted the compliance of the smoke free areas in hospitals.»

8 bis. Also, need to offer possible contributing factors to the success of the smokefree law. For example, practical guidance provided by the Catalan Network might be one success factor. Were there any media campaigns surrounding the introduction of the new law or education campaign to educate the public? What about enforcement and monitoring of the law?

We have addressed this point in the answer to Reviewer #2, since not all of the effect observed is due to the law itself but also to the actions from the Network. Please see corrections in the second paragraph ("main findings" heading in the Discussion).

9. Discussion - need to discuss findings in terms of broader implications for policy development in relation to FCTC. Can the same positive outcomes be expected or achieved in other public places?

We have added a sentence in the Discussion section in the terms proposed by the reviewer (4th paragraph "main findings" heading in the Discussion):

«Controlling smoking and SHS exposure in health care centers is hence a basic step in implementing such comprehensive tobacco control policies. Article 8 ("Protection from exposure to tobacco smoke") of the WHO Framework Convention on Tobacco Control (WHO, 2003) addresses the need to protect non-smokers from SHS exposure and clear guidelines for its implementation have been further developed (Convention of Parties (WHO FTCT), 2007), including the need of governments to implement comprehensive smoke-free legislations.»

10. Discussion - limitations of the study - first line, correct "voluntary" with "voluntarily".

Done.

11. Discussion - p8, second paragraph, correct "were" to "where" so that the sentence reads "A number of lost devices occurred in places where high .."

Done.

12. Discussion - strength of the study - line 4, add "the" so that the sentence reads "this is the first study in hospitals."

Done.

13. Conclusions - p8, replace "as" to "to be" so that the sentence reads "nicotine concentrations appears to be a reliable and effective system.."

Done.

14. Table 1 & Fig 1 - title stated that the period of measurement was from October-December for both before and after the ban whereas elsewhere, in abstract and Methods (p 4) the period was from September-December. Please correct accordingly.

The correct period is September-December. We have checked and changed the titles accordingly.

Segunda respuesta del editor y revisors del Preventive Medicine

No.: PM-08-190R1
Title: Secondhand smoke in hospitals of Catalonia (Spain) before and after a comprehensive ban on smoking at the national level.
Corresponding Author: Dr. Esteve Fernandez
Authors: Marcela Fu; Cristina Martinez; Jose M Martinez-Sanchez; Maria J Lopez; Anna Martin-Pujol; Francesc Centrich; Gloria Muñoz; Manel Nebot; Esteve Salto

Dear Dr. Fernandez,

We would be pleased to accept your manuscript, referenced above, for publication in Preventive Medicine, provided that the following additional changes are made:

Introduction -
1. Second paragraph line 1, replace "Besides" with "Beside".
2. Second paragraph line 8, replace "assuring" with "ensuring".
3. Third paragraph line 6, add "took effect" to the end of sentence so that it reads
"...after a comprehensive national tobacco control law took effect".

Methods -
4. First paragraph line 7, replace "in" with "on" in the sentence "...with a wind-screen in one side".
5. first paragraph line 17, correct "accordingly" with "according".
6. Second paragraph line 1, add "at" to first sentence so that it reads "Both at baseline and at follow-up.."
7. Second paragraph line 1, replace "From them" with "Of these".

Results -
8. Second paragraph line 5, add "at" to the sentence so that it reads "at baseline and at
follow-up ...".
9. Third paragraph line 3 & 4, correct sentence so that it reads "IQR, 0.23-3.43, followed by fire escapes..., and lowest in the surgical area dressing room (0.18 ug/m3,
IQR, 0.08-1.17) and hospitalization unit in general medicine."
10. Suggest adding % decline for all the results describing the changes from pre to post ban. For example, the sentence in third paragraph lines 5-7 "The greater changes occurred in general surgery hospitalization units, from 0.23 ug/m3 at baseline to concentrations under the limit of quantification at follow up (% decline=97.8, $p<0.01$),...."

Figure 1 -
11. The numbers on the y-axis should be corrected to have decimal point rather than a comma.
12. Footnote - correct "extrem" to "extreme".

Please submit your revision online within 30 days by logging onto the Elsevier Editorial System for Preventive Medicine:
http://ees.elsevier.com/pm/
Your username is: EFERNANDEZ
Your password is: fernan92

You will find the manuscript record listed under "Submissions Needing Revisions." Click "Revise" when you are ready to submit your revision. (If you have forgotten your password, please click the "Forget your password" link located on the log-in screen).

To facilitate the electronic publication of your manuscript, we request that your manuscript text, tables and figure legend be submitted in an editable format (Word, WordPerfect, or LaTex only), and all figures uploaded individually as TIF or EPS files, with no single file exceeding 500kb. Should you require assistance, please contact Author Support at AuthorSupport@Elsevier.com.

Thank you, and we look forward to receiving your revised manuscript.

With kind regards,

Alfredo Morabia, MD, PhD
Editor-in-Chief & Michael C. Costanza, PhD
Editor- Statistics
Preventive Medicine

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Segunda Respuesta al Editor de Preventive Medicine

Barcelona, September 3, 2008

Dear Prof. Morabia:

Please find enclosed our revised manuscript "Secondhand smoke in hospitals of Catalonia (Spain) before and after a comprehensive ban on smoking at the national level." for your consideration in the **Preventive Medicine** as an Original Research Paper. We have made the changes indicated in your email of Auhust 30.

1. We have corrected the text according to your suggestion
2. We have introduced the % decline in the Results section (as well as in the Abstract)
3. We have corrected the figure
4. We have made some corrections in some authors' affiliations (I was changing University at the time of the manuscript was written)

Thank you very much for your kind attention. With best regards,

Esteve Fernandez, MD, PhD

Head, Tobacco Control Research Unit, Institut Català d'Oncologia

Assistant Professor, Master of Public Health, Universitat Pompeu Fabra

E-mail: efernandez@ico.scs.es

Carta de aceptación del editor de Preventive Medicine

Ms. No.: PM-08-190R2
Title: Secondhand smoke in hospitals of Catalonia (Spain) before and after a comprehensive ban on smoking at the national level.
Corresponding Author: Dr. Esteve Fernandez

Authors: Marcela Fu; Cristina Martinez; Jose M Martinez-Sanchez; Maria J Lopez; Anna Martin-Pujol; Francesc Centrich; Gloria Muoz; Manel Nebot; Esteve Salto

Dear Dr. Fernandez,

We are pleased to inform you that your manuscript, referenced above, has been accepted for publication in Preventive Medicine. Your manuscript has been forwarded to Elsevier's Production Department. You will be contacted by them in the near future regarding the proofs of your article.

Thank you for submitting your paper to Preventive Medicine.

Most sincerely,

Alfredo Morabia, MD, PhD
Editor-in-Chief & Michael C. Costanza, PhD
Editor- Statistics Preventive Medicine

10.1.4. Correspondencia Artículo 4

Fernández E, Martínez C, Fu M, Martínez-Sánchez JM, López MJ, Invernizzi G, Ouranou A, Dautzenberg B, Nebot M. Second-hand smoke exposure in a sample of European hospitals (2007). Eur Respir J. 2009; 34(1):111-116.

Carta de presentación del manuscrito al editor de Europan Respiratory Journal

L'Hospitalet (Barcelona), November 28, 2008

Dear Editor-in-Chief:

Please find enclosed our manuscript "Second-hand smoke exposure in a sample of European hospitals (2007))" for your consideration in the **European Respiratory Journal** as an Original Article. We aimed at evaluating the levels of secondhand smoke in public hospitals in several European countries affiliated to the European Network for Smoking Prevention. We have measured the concentrations of particulate matter <2.5 um3 ($PM_{2.5)}$ using the same protocol and instrument in 30 hospitals uin 7 countries during 2007.

The paper shows that exposure to secondhand smoke is very low across this sample of European hospitals and without huge variations. The use of $PM_{2.5}$ as a marker of exposure to seconhand smoke is a feasible method to compare the compliance with the smoke-free regulations in hospitals both within countries and across countries. We believe these results are of interest for the international audience of the **European Respiratory Journal** given the quick development of anti-smoking legislation as a result of the application of the Framework Convention for Tobacco Control in developed and developing countries.

All the authors carefully read the manuscript and fully approve of it. In their name I also declare that the manuscript is original and it is not submitted anywhere other than the **European Respiratory Journal**. We would of course be ready to provide further information about our data and methods you so desire.

Correspondence about the manuscript should be addressed to myself as indicated in the first page of the manuscript.

Thank you very much for your kind attention. With best regards,

Esteve Fernandez, MD, PhD

Head, Tobacco Control Research Unit, Institut Català d'Oncologia

Assistant Professor, Department of Clinical Sciences, Universitat de Barcelona

E-mail: efernandez@ico.scs.es

Respuesta editor y revisores de la European Respiratory Journal

ERJ-01807-2008

23-Dec-2008
ERJ-01807-2008

Dear Dr. Fernandez,

Your manuscript entitled "Second-hand smoke exposure in a sample of European hospitals (2007)." has been reviewed by me and by expert reviewers. Based on the reviewers' recommendations, our own views, and the editorial standards used by the Editorial Board, we have to inform you that your manuscript cannot be accepted in its present form.

However, we will reconsider this decision if you are prepared to submit an adequately revised manuscript. All three reviewers see merit in your fieldwork and reserach topic. However, they also have significant repeatibility in highlighting your many shortcomings. The main points of criticism can be summarised as follows: limitations of study design and exposure assessments, faulty interpretation, and edition. All in all, as there is potential, you are encouraged to respond in a point by point document to the many comprehensive, constructive comments listed below, and incorporate them in a new version. You might consider an Online APPENDIX to some of the material and text. Make sure you review the instruction for authors, and kindly browse some recent issues of the ERJ, to make your format more ERJ friendly.

The full comments of the reviewers were the following:

Reviewer: 1

Comments to the Author The manuscript ERJ-01807-2008 reports on a large survey that collected measurements of second-hand smoke (SHS) conducted in several European hospitals. The manuscript reads well, and the topic of smoking exposure is indeed of Public Health importance. However, given the many limitations of design and sampling, some of them already highlighted by the authors, and given the complete absence of patient data, the current manuscript is of limited interest to the average ERJ reader. Some issues deserve further consideration:

Major comments:

1. Study design: More information on the "convenience" sample of countries and hospitals should be granted. It is unknown to the reader whether the six standard locations were surveyed in one or more hospitals per selected country, which limits any generazibility. An appendix with the hospital names would be welcome.

2. Exposure assessment: The technique and surveying seems rather primitive and subject to technician variability. Although the tool was the same, a proper protocol similar to the one used in dust assessments for occupational investigations should be described

Minor comments:

3. Abstract: Abstract and text should include not only median values, but how often the stated WHO indoor threshold of 25 was surpassed, and in Results or Discussion it should be discused why. Were results communicated to hospital managers for any intervention?.
Even qualitatively, are doctors, patients and/or visitors to blame?

4. Figures: Draw in figures the recommended WHO indoor threshold

Reviewer: 2

Comments to the Author

This multicenter, descriptive, cross-sectional study among a convenience sample reports the estimates of PM 2.5 in 30 selected hospitals in 7 European countries from 199(8 from smoking areas) samples and shows the levels are low. It is of interest to show the success of ENSH policy of smokefree hospitals which this study supports and it also shows that the small number of smoking areas tested were polluted.

The methodology fairly exhibits the severe limitations of the design but the uniformly low levels found are reassuring. The authors rightly draw attention to the small number of hospitals in an area as big as Europe.

There are some specific problems.To begin wit the title speaks of SHS exposure but no measurements of nicotine or its breakdown products or SHS specific toxic substance or biomarkers are made and so I don't think the title is accurate.

There are no health effects estimate which are the prime interest of a clinical journal. The small numbers are a problem with regard to representativeness of the sample.The absence of an indoor guide for particles is a further problem. The extrapolation from outdoor particle guidelines to indoor particle levels is not established or accepted. The toxicity of SHS may not be the same as ambient air and this makes this comparison fraught. There are a number of typos which can easily be
corrected.

The paper is clear and well presented and the data adds to our knowledge of SHS in Europe.

Reviewer: 3

Comments to the Author
Second-hand smoke exposure in a sample of European hospitals (2007).

This paper is focused on the assessment of the levels of second-hand smoke in European hospitals measuring the concentration of particles (PM2.5).

The paper is important since there are very few published studies about the measurement of tobacco constituents in hospitals and it provides an overall status on ETS exposure in European hospitals. The manuscript is well written and easy to read.

Below are some comments on it.

Introduction

The authors might provide information about the European Network for Smoke-free hospitals since this is the source of the sampled hospitals.

3rd paragraph: The authors affirm that the measurement of nicotine in the air provides an objective measurement of the personal exposure to environmental tobacco smoke, when what it really shows is the presence of environmental tobacco smoke, but not the personal exposure. Please modify the text.

Also, the authors stated that particles are "very selective" of SHS, but they point that the particles can come from other sources, therefore how can they be "very selective"? Please clarify in depth the statement and also indicate the sources that can produce them.

Materials and methods

About the sampled hospitals:

- Why a convenience sample? Why not all the hospitals, or a representative sample, in the ENSH?
- How the convenience sample was established? How did the hospitals know about the study? How did researchers contact with hospitals?
- Please provide information about the number of hospitals by country. The number of hospitals participating in every country is not clear.
- Some characteristics of the hospitals participating in the study will be welcome, for example: public or private hospitals, number of beds, location (urban or semi urban), etc

About the sampled areas:

- Did you do an observational study in the area that you are sampling? This is to gather information on the presence of smokers, presence of butts, smell of tobacco, sources of ventilation.? If it is like that, what results were obtained?
- When the authors explained the areas selected to be sampled they indicated that in some hospitals other areas might be sampled in the case that standard areas were not present. It is what they define as "other areas". But how do you explain the Romania situation? In this country all the measures were done in "other areas", why?
- It seems that in the hospitals where there were smoking rooms, measurements were carried out there. Is this like that? This should be explain in the methods section.

Authors should consider excluding values in smoking areas from the analysis, since they will influence the results.

About the period of the study:

Did the researchers take into account the influence of the central heating or the air-conditioning?

Results

The highest median concentration was in Romania, but in this country the measurements was done always in "other places". What the authors think on eliminating Romania of the analysis?

The concentration of particles in the smoking rooms of Greece are strange, and makes think that perhaps the hospitals knew the moment in which the

measurements were going to be done. Was the hospital warned of the concrete day in which was going to measure up?

In the table 2 and in the figure 1 the information is duplicated.

Please revise your manuscript carefully, by addressing all the points raised by the reviewers. We would like to emphasise that the invitation to resubmit a revised manuscript does not necessarily mean it will be accepted in its revised format!

Respuesta a los revisores de la European Respiratory Journal

ERJ-01807-2008

Second-hand smoke exposure in a sample of European hospitals (2007)

Dear Dr. Soriano:

Thank you very much for your e-mail of December 23, 2008. Please find enclosed our response to the useful reviewers' comments. We have responded point-by-point as suggested, indicating when necessary the changes introduced in the manuscript. These changes are marked in red within it.

We have checked the text and also the tables and figures. In Table 2, we now have introduced some PM2.5 values that were omitted in the original submission. They correspond to median values with one single measurement. Although they were taken into account to compute median values by country and location, its value was not in the Table (ie, the value 3.0 in fire escape in Austria).

All the authors carefully read the revised manuscript and fully approve of it. In their name I again declare that the manuscript is original and it is not submitted anywhere other than the European Respiratory Journal. We would of course be ready to provide further information about our data and methods you so desire.

Thank you very much again for your kind attention and valuable time.

With best regards,

Esteve Fernández

Reviewer: 1

The manuscript ERJ-01807-2008 reports on a large survey that collected measurements of second-hand smoke (SHS) conducted in several European hospitals. The manuscript reads well, and the topic of smoking exposure is indeed of Public Health importance. However, given the many limitations of design and sampling, some of them already highlighted by the authors, and given the complete absence of patient data, the current manuscript is of limited interest to the average ERJ reader. Some issues deserve further consideration:

Major comments:

1. Study design: More information on the "convenience" sample of countries and hospitals should be granted. It is unknown to the reader whether the six standard locations were surveyed in one or more hospitals per selected country, which limits any generazibility. An appendix with the hospital names would be welcome.

We grant more details about the sample of hospitals in countries in the first paragraph of the Material and Methods:

> *"The national coordinator of the Smoke-free Network in each country asked different hospitals to participate, taking into account the limited timeframe to do the measurements in each country (because the particle monitor had to go from one country to another, see below). Our initial goal was to include 5 hospitals in as many countries as possible, but we obtained collaboration from seven countries."*

In the same paragraph we specify that in each hospital the same locations were measured. We believe that now it is clearer that we tried to have six samples in each of the participating hospitals:

> *"We defined 6 standard locations within each hospital to perform measurements by centrally trained investigators: (...)"*

We have added an annex with the name of the participating hospitals.

2. Exposure assessment: The technique and surveying seems rather primitive and subject to technician variability. Although the tool was the same, a proper protocol similar to the one used in dust assessments for occupational investigations should be described.

The reviewer is right because the use of the Aerocet device is very simple. As explained in the paper, we centrally trained the local investigators and provided a simple one-sheet protocol of operations. We further explain some other details in the 2nd rewritten paragraph of Methods:

> *"In addition, measurements were taken in other areas at the local investigators criteria when the standard sampling areas were not available. Smoking areas in hospitals with these zones were also measured. Except in halls, all locations were not affected by air flows that potentially affect particles in the air. For each $PM_{2.5}$ measurement the following data were recorded: hospital and location, date of measurement, sampling area, sampling volume, ventilation, and signs of smoking (tobacco smell, cigarette butts on the floor, presence of ashtrays, and persons smoking).*
>
> *(…)*
>
> *The operation was manual, with a user-friendly interface. The device was used with a short length of Tygon on a flat surface, not in the floor of the room, preferably in the middle, and away from any doors or windows. Due to logistic constraints and because all locations were indoors, short (2-minute) for a mass sample type monitoring sessions were carried out in each location. The device displayed in the screen $PM_{2.5}$ and relativity humidity values, that kept registered in the same device, and were transferred to a computer in the coordinating center. We sampled the hospitals between March and July 2007 in all the countries except in Romania."*

Minor comments:

3. Abstract: Abstract and text should include not only median values, but how often the stated WHO indoor threshold of 25 was surpassed, and in Results or Discussion it should be discused why. Were results communicated to hospital managers for any intervention?. Even qualitatively, are doctors, patients and/or visitors to blame?

As the reviewer suggests, we specify in the Abstract the values over the WHO outdoor threshold (please note that guideline for indoor levels does not exist to date):

"11 measures (5.5%) were over 25.0 μg/m^3, which is the 24 hour average(…)."

In the 2nd paragraph of the Results section, we added the locations and countries of these measures:

"These measurements were taken in cafeterias, in smoking areas and in "other zones" from Greece, Belgium and Romania hospitals, respectively."

And in the 1st paragraph of the Discussion section we specify once again the locations:

"Those locations with values over 25 μg/m3 were smoking zones, one cafeteria located in a separate building next to the hospital, and "other zones". However, these "other zones" included areas with restrictions on smoking (such as consultation rooms, patient rooms, and doctors offices), and hence indicates a violation of the smoke-free policy."

4. Figures: Draw in figures the recommended WHO indoor threshold

We find the suggestion of the reviewer very helpful for the understanding of the figures and hence have added the threshold by means of a dashed line.

Reviewer: 2

This multicenter, descriptive, cross-sectional study among a convenience sample reports the estimates of PM $_{2.5}$ in 30 selected hospitals in 7 European countries from 199(8 from smoking areas) samples and shows the levels are low. It is of interest to show the success of ENSH policy of smokefree hospitals which this study supports and it also shows that the small number of smoking areas tested were polluted.

The methodology fairly exhibits the severe limitations of the design but the uniformly low levels found are reassuring.

The authors rightly draw attention to the small number of hospitals in an area as big as Europe.

There are some specific problems.

1. To begin wit the title speaks of SHS exposure but no measurements of nicotine or its breakdown products or SHS specific toxic substance or biomarkers are made and so I don't think the title is accurate.

Many reports use $PM_{2.5}$ as a marker of SHS, and it is widely accepted that it is a good proxy for SHS exposure. So we think it is correct to include in the title "secondhand smoke".

2. There are no health effects estimate which are the prime interest of a clinical journal.

The study is not aimed to investigate health effects but the exposure to a hazard to health of important public health impact. However, we have added a paragraph in the Discussion (2nd paragraph) linking exposure to PM to its well-known health effects:

> *"There are several particulate matter health effects on the respiratory and cardiovascular systems in children, adults and susceptible groups within general population; and the epidemiological evidence shows adverse effects of particles after both short- and long-term exposures [WHO air quality guidelines global update 2005]. Our results show low levels of $PM_{2.5}$; nevertheless, the risk for various outcomes increases with exposure, and there is little evidence suggesting a threshold below which no adverse health effects would be anticipated[WHO air quality guidelines global update 2005]. Thus, according to WHO air quality guidelines, the aim must be to achieve the lowest concentrations possible in order to minimise risk effects."*

3. The small numbers are a problem with regard to representativeness of the sample.

We agree with the reviewer comment. This is a pilot study involving only a little portion of hospitals, even considering that it was not at random. Nevertheless, we think that, despite this recognized limitation, our study is valid and of interest to potential readers. Although generalizability is not warranted, this study is the first one showing $PM_{2.5}$ levels in a wide sample of hospitals in different locations and countries, showing the feasibility of such a study and its use for PM monitoring across time. We already mentioned in The Discussion the limitations due to the relative small sample size.

4. The absence of an indoor guide for particles is a further problem. The extrapolation from outdoor particle guidelines to indoor particle levels is not established or accepted. The toxicity of SHS may not be the same as ambient air and this makes this comparison fraught.

As WHO Air Quality Guidelines set, it is true that recommendations are extensive on exposures to and health effects of pollutants from outdoor sources. Nevertheless, according to the updated WHO Air Quality Guidelines (2005) (now included in the reference list), those guidelines should be interpreted as applying in all microenvironments where population exposure occurred, both outdoors and indoors. With regard to PM health effects, it is clear that higher concentrations are linked to higher risks, and we have also noted it in the Discussion.

We added a phrase explaining this and deleted the last phrase in the 4th paragraph:

> *"Most of the measurements were below the 24-hour average limit recommended by WHO and US Environmental Protection Agency in both outdoors and indoors [13,14]. The chemical composition of outdoor pollutants can be different from that of the indoor air measured in our hospitals. Outdoors PM concentrations used to be higher than indoors, although the time of exposure should be also considered for risk assessment. Moreover, the air quality guidelines refers to 24h or annual average level, instead of our spot measures. Nevertheless, although the site of exposure, indoors or outdoors, determines the composition of the air and the concentration of the various pollutants, it does not directly affect the exposure-response relationship [13,15]."*

6. There are a number of typos which can easily be corrected.

All detected typos were corrected.

The paper is clear and well presented and the data adds to our knowledge of SHS in Europe

Reviewer: 3

This paper is focused on the assessment of the levels of second-hand smoke in European hospitals measuring the concentration of particles ($PM_{2.5}$).

The paper is important since there are very few published studies about the measurement of tobacco constituents in hospitals and it provides an overall status on ETS exposure in European hospitals. The manuscript is well written and easy to read.

Below are some comments on it.

Introduction

1. The authors might provide information about the European Network for Smoke-free hospitals since this is the source of the sampled hospitals.

We added more information about the European Network in the 2nd paragraph of the Introduction:

> *"The ENSH is a non-governmental organization coordinating national and regional Smoke-free networks from 20 European countries including about 1,400 hospitals. The ENSH promotes common strategies to obtain tobacco-free environments and to provide active support for quitting by patients, visitors, and staff among European hospitals. The ENSH activities are based on a "European code of smoke free hospitals & health services", providing various tools to support a successful implementation of tobacco-free policies in health facilities (http://www.ensh.eu)."*

2. 3rd paragraph: The authors affirm that the measurement of nicotine in the air provides an objective measurement of the personal exposure to environmental tobacco smoke, when what it really shows is the presence of environmental tobacco smoke, but not the personal exposure. Please modify the text.

We acknowledge the reviewer the comment and have erased the word "personal" in that paragraph:

> *"(…) that can be objectively measured in body fluids (urine, blood, and saliva) or in the air providing an objective measurement of SHS exposure [6]."*

3. Also, the authors stated that particles are "very selective" of SHS, but they point that the particles can come from other sources, therefore how can they be "very selective"? Please clarify in depth the statement and also indicate the sources that can produce them.

Although particles can be originated from various sources of combustion, SHS is generally the only source of particles indoors in the absence of combustion sources. We have corrected our previous sentence ("very selective" has been deleted) and added an explanation about sources of $PM_{2.5}$ in the 3rd paragraph of the Introduction:

> *"$PM_{2.5}$ are originated from all types of combustion, including motor vehicles, residential wood burning, forest fires, some industrial processes, etc. Although $PM_{2.5}$ particulates may derive from particles of dust and other combustion activities, smoking is generally the largest contributor to indoor air pollution [11]."*

Consequently, we added a statement in the limitations section of Discussion:

> *"Last but not least, in the interpretation of the results it must be taken into account that SHS is not the only source of indoor particulate matter, although it is considered its main contributor."*

Materials and methods

About the sampled hospitals:

4. Why a convenience sample? Why not all the hospitals, or a representative sample, in the ENSH?

5. How the convenience sample was established? How did the hospitals know about the study? How did researchers contact with hospitals?

Please see the response for the first point to Reviewer 1.

6. Please provide information about the number of hospitals by country.

The number of hospitals participating in every country is not clear.

We specified the number of hospitals in each country in the new 1st paragraph of Material and Methods (also rewritten to provide some characteristics of the hospitals):

"This is a multicenter, descriptive, cross-sectional study among a convenience sample of 30 hospitals in 7 European countries with different smoking prevalence rates and tobacco control activity (Table 1). We included one hospital from Austria, five from Belgium, three from France, five from Germany, seven from Greece, four from Romania, and five from Spain. Most hospitals were in urban areas and were general and specialized (maternities, oncological, children) hospitals. Most of them were affiliated to university schools of and or nursing and all were members of the ENSH"

7. Some characteristics of the hospitals participating in the study will be welcome, for example: public or private hospitals, number of beds, location (urban or semi urban), etc

The reviewer is right that some information about the main characteristics of the hospitals would be of interest. Since the hospitals are so different among them, it is very complicated to summarize the data in a simple table. We have added a sentence with the overall profile of the hospitals. Please see new re-written paragraph 1 (point 6).

About the sampled areas:

8. Did you do an observational study in the area that you are sampling?

This is to gather information on the presence of smokers, presence of butts, smell of tobacco, sources of ventilation.? If it is like that, what results were obtained?

We did an observational measure of indirect signs of tobacco smoking (tobacco smell, presence of ashtrays, of butts or ashes, and people smoking), as well as if there was any system of ventilation and signals about smoking ban. However, information was missing in 26% of observations for ashtrays, butts or tobacco smell presence, and 37% for presence of people smoking, and the number of observations with any sign was very small (n=27). These were the main reasons not to include those results in the manuscript submitted, together with the lack of a clear or consistent pattern (maybe due to the missing values in the dataset), as you may see in the following table:

	No signs	1 sign	2 signs	3 signs	4 signs
$PM_{2.5}$					
Median	4.0	6.0	4.5	5.5	6.0
IQR	2.0; 8.0	3.0; 9.0	3.3; 6.5	2.8; 14.0	4.0; 32.5
N	98	9	4	6	8

We are inclined to briefly include this information narratively at the end of the Results section:

> *"The median $PM_{2.5}$ concentration in locations with no signs of smoking was 4.0 (interquartile range: 2.0, 8.0) and significantly increased to 6.0 (interquartile range 4.0; 32.5) when all smoking signs were present (test for linearity, p=0.020)."*

We also have added the corresponding explanation in the Methods section:

> *"For each $PM_{2.5}$ measurement the following data were recorded: hospital and location, date of measurement, sampling area, sampling volume, ventilation, and signs of smoking (tobacco smell, cigarette butts on the floor, presence of ashtrays, and persons smoking)."*

9. When the authors explained the areas selected to be sampled they indicated that in some hospitals other areas might be sampled in the case that standard areas were not present. It is what they define as "other areas ". But how do you explain the Romania situation? In this country all the measures were done in "other areas", why?

Romania entered late to the study, and different areas were assessed other than the established ones. Although this is a problem for interpreting the results, we opted to maintain these data because they are the only information about SHS exposure in hospitals in that country. If the Editor considers not appropriate to include this information, we can remove it from the table and make the corresponding changes across the manuscript.

10. It seems that in the hospitals where there were smoking rooms, measurements were carried out there. Is this like that? This should be explain in the methods section.

As the reviewer advices, we now explain this detail in the 1st paragraph of the Methods section:

> *"Smoking areas in hospitals with these zones were also measured."*

11. Authors should consider excluding values in smoking areas from the analysis, since they will influence the results.

We partly agree with the reviewer's comment. The inclusion of values from smoking areas influence the overall ("all locations") values to a limited extent, since they are only 8 observations (199 in total). Moreover, we have computed medians as the statistics of centrality, which is not influenced by extreme values. In addition to these statistical considerations, we also believe that the overall picture is better defined including measurements in locations where smoking was allowed.

About the period of the study:

12. Did the researchers take into account the influence of the central heating or the air-conditioning?

As the reviewer noted, we did not take into account nor central heating or air conditioning. However, the relative humidity indoors was almost constant in all hospitals and across countries. We do not consider necessary to further elaborate in this point in the manuscript.

Results

13. The highest median concentration was in Romania, but in this country the measurements was done always in "other places". What the authors think on eliminating Romania of the analysis?

As explained above (see point 9, reviewer 3), we are inclined to include Romania because our data are the only information about SHS exposure in hospitals in that country. If the Editor considers not appropriate to include this information, we can remove it from the table and make the corresponding changes across the manuscript.

14. The concentration of particles in the smoking rooms of Greece are strange, and makes think that perhaps the hospitals knew the moment in which the measurements were going to be done. Was the hospital warned of the concrete day in which was going to measure up?

In general, hospitals were not warned about the measures. Although this had occurred, we think that it would not have influenced the results, because particulate matter can remain in the air for 2-3 days in indoor environments.

15. In the table 2 and in the figure 1 the information is duplicated.

The reviewer is again right with the comment that information in Table 2 and Figure 1 is redundant. However, we believe that the Figure offers a very good visual information of the distribution of $PM_{2.5}$ by countries and its comparison with the WHO air quality limit for $PM_{2.5}$, as suggested by reviewer 1. If the Editor considers not appropriate to include Figure 1, we can remove it.

Decisión final del editor de la European Respiratory Journal

13-Feb-2009

ERJ-01807-2008.R1

Second-hand smoke exposure in a sample of European hospitals (2007).

Dear Dr Fernandez:

I am pleased to see that your manuscript has been accepted for publication in the European Respiratory Journal. At this stage we require you to provide a signed copyright form for all authors. Can you please contact your co-authors and ask them to complete the attached PDF of the form and fax it back to me as soon as possible. Please note that delay in receiving these completed forms could delay publication.

Kind regards,

Claire Ryan
Editorial Assistant
European Respiratory Society Journals Ltd
442 Glossop Road
Sheffield
S10 2PX
South Yorkshire
UK

10.1.5. Correspondencia Artículo 5

Cristina Martínez, Jose M Martínez-Sánchez, Montse Ballbè, Marcela Fu, Montse Puig, Esther Carabasa, Josep Maria Sánchez-García, Esteve Saltó, Esteve Fernández, & the Tobacco Cessation Program project coordinators. Effectiveness of a coordinated smoking cessation program addressed to hospital workers. Hospitals. Am J Manag Care. [Enviado].

Carta de presentación del manuscrito al Editor de American Journal of Managed Care

American Journal of Managed Care

Barcelona, January 24th 2011

Dear Editor:

Please find enclosed the manuscript "Effectiveness of a coordinated smoking cessation program addressed to hospital workers". This paper evaluates the success of the Catalan Network of Smoke-free Hospitals smoking cessation program in terms of abstinence among workers of the participating hospitals. Thus, we would appreciate your considering this manuscript for publication as an Original Paper in the *American Journal of Managed Care*.

The authors of the paper directly participated in the planning, analysis, and writing of the paper, have approved the final version here submitted, and will take public responsibility for the content of the paper.

The article is original and it is not submitted anywhere other than your journal. There is no conflict of interests regarding this investigation. We would of course be ready to provide further information about the data and methods you so desire.

Thank you very much for your kind attention. We look forward to hearing from you.

Sincerely,

Cristina Martínez, RN, BA, Ph.D Candidate
Tobacco Control Research Unit
Institut Català d'Oncologia
E-mail:cmartinez@iconcologia.net

10.2 Anexo II

Artículos relacionados con la tesis

10.2.1 . Artículo Anexo 1

Martinez C. Barriers and Challenges of Implementing Tobacco Control Policies in Hospitals: Applying the Institutional Analysis and Development Framework to the Catalan Network of Smoke-Free Hospitals. Policy, Politics, & Nursing Practice.2009; 10(3):224-232

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XX(X) 1–9

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http://ppn.sagepub.com
SAGE

Barriers and Challenges of Implementing Tobacco Control Policies in Hospitals: Applying the Institutional Analysis and Development Framework to the Catalan Network of Smoke-Free Hospitals

Cristina Martinez, BA, RN[1]

Abstract

This article analyzes tobacco control policies in hospitals based on the experience of the Catalan Network of Smoke-Free Hospitals, Spain. The objective is to understand through this case study how tobacco policies are designed and implemented in health care organizations. Because tobacco control is a public health issue, governmental, institutional, and professional involvement is necessary. This article identifies and examines the structure and relationships among the different actors involved in the tobacco control policies in health care organizations using Ostrom's Institutional Analysis and Development framework. This theory helps one understand the policy failures and rethink the future challenges. Critical issues should be reviewed to enhance implementation of smoke-free hospitals—such as assuring the compliance of nonsmoking areas and introducing compulsory tobacco cessation activities that are promoted and monitored by the public administration. The author suggests that relying primarily on an organization's interpretation of rules leads to irregular implementation.

Keywords

public health, political action, state legislation, community health, certification/accreditation

Introduction

The health risks associated with tobacco consumption are well documented. At the beginning of the 21st century, tobacco consumption continues to be the single largest cause of preventable morbidity and mortality in Spain (Fernandez, 2006). Approximately 55,000 people die every year because of tobacco consumption, representing 16% of the total deaths in Spain (Banegas, Diez Ganan, Gonzalez Enriquez, Villar Alvarez, & Rodriguez-Artalejo, 2005). Furthermore, exposure to secondhand smoke (SHS) at home and at work leads to more than 3,000 deaths from lung cancer and ischemic heart disease (Lopez et al., 2007). Despite its magnitude, the epidemic could be controlled by applying policies contained in the Framework Convention on Tobacco Control (FCTC), the world's first global public health treaty (Shibuya et al., 2003). After the Spanish government's ratification of this treaty, a new law for prevention and control of smoking was enacted in January 2006. Following that law, restrictions on selling, advertising, and using tobacco in public spaces, workplaces, and hospitals have been laid in Spain (LEY 28/2005, 2005).

In Catalonia—one of the 17 autonomous regions of Spain—earlier national and regional legislation restricted tobacco consumption in hospitals. However, smoking rooms and smoking areas within the hospital's cafeterias were allowed until the passage of the new law. The 2006 law completely bans smoking in all health care facilities but gives the responsibility for implementing tobacco prevention and cessation interventions to regional administrations.

As health organizations, hospitals should set an example in controlling tobacco consumption and championing compliance with the law (Hausmann, Jeong, Bost, & Ibrahim, 2008; Rigotti et al., 2000; West, McNeill, & Raw, 2000). In Catalonia, the Catalan Network of Smoke-Free Hospitals (henceforth Catalan Network), funded by the Catalan government, promotes the implementation of nine tobacco control policies included in the European Network of Smoke-Free Hospitals' code. The Catalan Network provides expert counseling, training, and education; offers mutual support; helps implement tobacco cessation protocols; and evaluates different

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projects using empirical methods (Garcia, Mendez, Martinez, Peris, & Fernandez, 2006; Martinez, Garcia, Mendez, Peris, & Fernandez, 2008; Nardini et al., 2004). Hospitals' membership in the Catalan Network is voluntary, but the regional government encourages hospitals to join in order to set the same standards in tobacco control activities across hospitals. Although the Catalan Network helps implement the smoke-free project in each member hospital and develops a quality accreditation system, it is not responsible for the enforcement of the policies at hospitals. The level of compliance with tobacco control policies depends on the hospital itself, and the national and regional governments rely on each health organization to apply the law. In addition, the Catalan government only sporadically audits compliance with the law through on-spot inspections of hospitals.

Compounding this problem of compliance is the fact that in Catalonia tobacco consumption among health professionals is high: About 24.5% of doctors and 35.1% of nurses smoke (Servei Catala de la Salut, 2002). In addition, although the prevalence among the general population has decreased in the past 15 years, it still remains substantial with 34.5% of males and 24.3% of females who are smokers (Departament de Salut, Generalitat de Catalunya, 2006). Furthermore, hospitalized smokers often report craving symptoms in the absence of any intervention aimed at controlling tobacco withdrawal symptoms (Nieto, Abdel Kader, Rosado, Carriazo, & Arias, 2003; Sabido, Sunyer, Masuet, & Masip, 2006). Despite the obvious need, not many hospitals ensure that patients, visitors, or employees are provided with tobacco cessation programs. This finding is consistent with those of studies conducted in Australia and the United States (Freund, Campbell, Paul, Sakrouge, & Wiggers, 2005; Freund et al., 2008; Rigotti et al., 2002).

A recent study recommended that hospitals in Catalonia expand their tobacco control policies. The areas that need improvement include more "education and training," more precise "identification of smokers and cessation support," and providing a "healthy workplace" (Martinez et al., 2008; see the appendix for the 10 areas included in the European Code of Smoke-Free Hospitals). Although smoking inside the hospitals was completely forbidden after the approval of the 2006 law, some hospitals are lax in enforcement. For instance, smoke particles have been detected in emergency stairways and changing rooms (Fernandez et al. 2008). Studies from England indicate that enforcement of the smoke-free policies in health services remains a challenge after the implementation of smoking restrictions. Consequently, exemptions are frequently granted and policy breaches appear to be commonplace (Ratschen, Britton, & McNeill, 2008).

The World Health Organization (WHO) argues that health professionals should be role models in tobacco control, respecting bans and practicing according to tobacco cessation guidelines at their workplaces (WHO Tobacco Free Initiative, 2005). However, many barriers impede the incorporation of tobacco interventions into daily practice. Challenges include the high number of health professionals who still smoke, compounded by their lack of education on the subject and not following well-established smoking cessation protocols regularly offered in health care organizations (Bialous, Kaufman, & Sarna, 2003; Percival, Bialous, Chan, & Sarna, 2003; Sarna & Bialous, 2005; Sarna, Bialous, Barbeau, & McLellan, 2006; Sarna, Wewers, Brown, Lillington, & Brecht, 2001).

The literature suggests that hospital tobacco control policies increase staff and patient satisfaction, facilitate the reduction of cigarette consumption, and increase the desire to quit and the likelihood of cessation (Longo et al., 1998; Longo, Johnson, Kruse, Brownson, & Hewett, 2001; Martinez et al., 2008). However, there are few studies that analyze (a) how hospital policies are designed; (b) how these policies affect staff beliefs, values, and behaviors; and (c) how these policies modify existing social norms in the hospital and established rules. In addition, no study has explored how these processes affect hospitals and health institutions when implementing well-established and comprehensive tobacco prevention and cessation programs. Tobacco control in Catalonia is a social dilemma[1] (Ostrom, 1998, p. 3) in which large numbers of individuals (public administrators, management, and hospital workers) make choices in an interdependent situation. These individuals make choices about whether to participate in curbing the tobacco epidemic.

This article analyzes the policy implications of tobacco control in Catalan Hospitals using the Institutional Analysis and Development (IAD) framework to clarify how these policies are designed and how they are implemented. The IAD framework was developed by Elinor Ostrom and colleagues "to study how institutions affect the incentives confronting individuals and their resultant behaviors" (Ostrom, 2005, p. 9). We employ the IAD framework to identify the variables, recognize the problems, and rethink solutions that affect tobacco control policies in institutions. Using Catalonia as a case study, we explore aspects of the relationship between health organizations and public health institutions. In addition, the use of this framework enables us to analyze interorganizational policy implications, to make comparisons and evaluations, and to identify common failures and challenges among institutions in becoming smoke-free. Considering and understanding the role that hospitals and public administrations play in the formulation of tobacco control policies in Catalonia may help improve policy making.

IAD's Rationale, Main Concepts, and Levels of Relations

According to Crawford and Ostrom (1995), institutions are "the shared concept used by humans in repetitive situations, and they are organized by rules, norms, and strategies" Crawford and Ostrom (1995: 282). Institutional rules, norms, and shared strategies are constructed by human interaction in frequently occurring or repetitive situations. Institutions promote socially

beneficial outcomes by helping actors resolve "social dilemmas" that result when individual rational actions aggregate to produce socially irrational outcomes (Ostrom, 2000). Thus, institutional agreements provide the means to resolve social irrational outcomes.

The first concept of the IAD framework is the *action arena*, which Ostrom (2007) defines as "the social place where individuals interact, exchange goods and services, engage in appropriation and provision activities, solve problems, or fight" (p. 28). The action arena embraces the notion of an *action situation*, defined as the structure where human action results. The set of variables and its relations used to describe the structure of an action situation are "participants in positions who decide actions according to the information they possess about how actions are liked to potential outcomes and their potential benefits and costs" (Ostrom, 1994, p. 29). *Actors* can be individuals, groups, or corporations.

Rules are statements about what conduct is required, prohibited, or permitted and which sanctions are authorized if they are not followed. Rules are created by humans to solve problems. But sometimes the solution is to change the established rules with a hope that new outcomes will emerge. The stability of a rule depends on the meaning that actors give to it. There are different types of working rules that affect the structure of an action situation (Ostrom, 2007). However, action situations are also affected by the "physical world" variables that differ in each setting. In the case of hospitals, some characteristics of the physical world are the level of technology, the number of beds, the amount of staff, the location, and many other factors that could describe the health care facility. Others external elements that describe the world are the amount of resources, temporality, and the existing situation (Ostrom, 2007).

The IAD framework operates in a multidimensional framework, describing three levels of action: (a) the *operational level*, which includes daily activities; (b) the *collective level*, which is the stage in which decision makers create rules that have an impact on the operational levels; and (3) the *constitutional level*, in which decision makers determine how collective participants will be selected and what is the relation among their members.

Having discussed the main characteristics of the IAD framework, we can now examine tobacco control policies in hospitals as a social dilemma. This examination is presented in four parts. First, we present the historical context for tobacco control and the involvement of hospitals in smoke-free initiatives in Catalonia. Second, we present two possible options for addressing the problem, the advantages, and the disadvantages. Third, we discuss the relevance of using IAD to address this policy problem. Finally, we present two suggested policy measures.

Historical Context

For many years, tobacco consumption was accepted in Spanish society as a cultural and social pattern and was regarded merely as a bad habit instead of an addiction (Garcia Jorda, 2006). However, in recent years, Spanish society has become more conscious about the hazards of tobacco and the need of being protected against SHS (Fernandez, 2006; Salto, Joan, Valverde, Baranda, & Plasencia, 2006). This behavioral shift has been produced largely as a result of a significant public health effort after the Framework Convention of Tobacco Control (FCTC) was ratified. As a consequence, some Spanish organizations and public health leaders created the necessary level of public understanding to draft a new law that protects citizens from SHS and also includes other tobacco control measures as part of complying with the FCTC (Cordoba, Villalbi, Salvador-Llivina, & Lopez-Garcia Aranda, 2006). This new publically accepted perspective opened a window of reform opportunity (see Kingdon, 1995). The Spanish government drafted a new law that enhanced citizens' health protection and consequently reduced the amount of SHS in public spaces, workplaces, and hospitals. In January 2006, Spain became the sixth European country to put in place a comprehensive regulatory framework to prevent and control smoking. However, regional governments within Spain were given the obligation of ensuring compliance with the new law and the power to improve the legislation in each region.

With an overall population of around 7 million and located in northeastern Spain, Catalonia has become a pioneer in tobacco control and is a national role model. Since 1981, Catalonia has gathered epidemiological data about attitudes toward smoking and the rate of consumption. In addition, regional antitobacco legislation introduced in Catolonia was one of the most advanced in Spain, occurring ever before the implementation of the current national law. Moreover, since the 1990s, professional groups (doctors, nurses, and teachers) in Catalonia have piloted other smoke-free initiatives (Salleras, 1999).

One striking example of these early efforts includes the Catalan Institute of Oncology (ICO), a Comprehensive Oncology Hospital in Barcelona, which began implementation of a "smoke-free" policy in 1997 (Mendez, Garcia, Margalef, Fernandez, & Peris, 2004). This was based on the successful experience of implementing smoking bans by the Joint Commission on Healthcare Organizations (JCAHO, now known as The Joint Commission) in the United States (Longo et al., 1996; Longo et al., 1998) and the European Network of Smoke-Free Hospitals (ENSH, 1999). The ICO used an organizational cultural change model and introduced step-by-step tobacco consumption limitation measures that involved all the members of the institution. In 2000, because of the successful accomplishment of the smoke-free policies within the institution, the ICO made available its experience to the rest of the public regional hospitals of Catalonia, thus creating the Catalan Network of Smoke-Free Hospitals.

Organizational Change in Tobacco Consumption Policies: The Catalan Model

The Catalan Network follows the guidelines of the ENSH to promote the implementation of tobacco control policies

(Garcia et al., 2006). The Catalan Network promotes a "smoke-free hospital" project based on organizational and cultural change. This project requires the commitment of the organization in integrally and progressively adopting a series of ten standards (see the appendix). The organizational changes involve creating a policy working group integrated by hospital management and other key people within the institution. This working group is responsible for the design, scaling down, communication, monitoring, and evaluation of the tobacco control policy. The working group then clearly communicates the policies to the rest of the staff members, the patients, and the community.

The first efforts in implementing the project address passive tobacco control measures. These policies consist of prohibiting smoking at all enclosed hospital facilities, including main entrances (the most common smoking spot), clearly indicating that the institution is smoke free and signaling so with posters and sign points. Moreover, at this stage a baseline survey measuring the attitude toward tobacco consumption and compliance with the project among the workers should be carried out.

The Catalan Network guides each institution in the process of becoming a smoke-free hospital, providing expert counseling and support. Once the hospital achieves compliance with smoke-free areas, it should go further and offer tobacco cessation programs. To facilitate this process, the Catalan Network provides education and training in tobacco cessation and smoking cessation programs targeting both health professionals and patients. In addition, the Catalan Network evaluates annually the level of compliance with the European standards in each hospital to detect any failures and future challenges. These active policies and evaluation activities have been funded by the Catalan government since 2005.

After 8 years of promoting this model throughout Catalonia, 47 of the 61 public hospitals in Catalonia are smoke free (Garcia et al., 2006). Out of that total, 33 hospitals offer tobacco cessation programs for health professionals and 15 offer them for patients. Despite this achievement, the majority of hospitals still provide inadequate tobacco cessation services. Evaluation of this outcome has identified problem areas that could improve the results of the initiative: informing new staff about the smoke-free policy during the recruitment process, establishing methods to monitor compliance with the law among the staff, and creating an internal procedure in case of infringement. In addition, another current failure is that there is no systematic approach to assist smokers in hospitals. For example, many hospitals do not provide tobacco cessation services for patients. Providing counseling and assistance is completely dependent on the commitment and motivation of individual health professionals. Additionally, some hospital managers have shown a low level of support in designing internal policies for both patients and workers. What is more, in these hospitals the administration shows inadequate control of the level of establishment and success of smoke-free areas and lacks monitoring mechanisms to measure the number of beneficiaries of cessation programs.

Stakeholder Analysis

Using the IAD framework, we identified three types of stakeholders who correspond to the three described levels of action that operate in this multidimensional condition—the constitutional level, the collective level, and the operational level.

In our case study, the constitutional level includes the national government, which delegates responsibility to the Catalan administration to prevent and control tobacco consumption in the region. The Catalan government supports the Catalan Network to encourage these activities in hospitals by providing funds. With these resources, the Catalan Network promotes the tobacco control standards; however, the network does not have legal authority over hospitals. The Catalan Network allocates government resources to make available training activities, provide cessation programs, distribute free cessation drugs (such as nicotine replacement therapy), and permits evaluation activities such as measuring nicotine concentrations in the hospitals' physical facilities. The Catalan government, which reimburses hospitals for other health promotion activities, does not directly reimburse hospitals for this assistance activity. This means that tobacco cessation is distinguished from the other primary health activities in hospitals and pushed into a second-class status.

At the collective level, management and members of the working group are responsible for designing internal procedures, assisting in the implementation process, and delivering the smoke-free message to workers, patients, and visitors. This level requires good communication of decisions and rules. These factors will determine the success of the policies together with other characteristics of the organizations such as the institutional size, the heterogeneity of the participants, the perceived benefits received, the outcomes expected, and the monitoring techniques applied.

The operational level corresponds to daily activities. Several factors influence individuals in social dilemmas—factors such as motivation, social identity, and cooperation. The actors in our case study are hospital workers (including health professionals and other staff members), patients, and the community. Health professionals are responsible for providing interventions to the patients. Other staff members give coherence to the message if they accomplish the norms and set a good example. Smokers should abstain from tobacco during their hospital stay and ask for tobacco cessation programs, creating demand. Finally, the community should request promotion and prevention activities within hospitals in addition to a greater level of coordination among hospitals and primary care services.

A national tobacco control analysis should include these three levels of study (national/regional, institutional, and individual) to evaluate how the norms and rules are created

and how they affect the operational level (day-to-day decisions), the collective level (group decisions), and the constitutional level (administration decisions) in hospitals.

From this perspective, and assuming the above-mentioned context, achievements, and failures of the program, we identified five key management and executive outcomes that currently impeded successful progression of this project:

1. Insufficient government evaluation of health institutions' activities and their enforcement of the law
2. Lack of internal and external measures of monitoring compliance with the rule and a lack of consequences for breaking them
3. Weak commitment of hospitals' management in adapting the law to each hospital setting, and no comprehensive translation of ENSH tobacco control standards to hospitals
4. Inadequate tobacco cessation programs and lack of systematic protocols in hospitals
5. Low motivation and involvement of health professionals and other key actors within the institution

According to the literature, three policy strategies can be implemented to solve problems in public social dilemmas. These include motivational, strategic, and structural approaches (Bardach, 2000; Birkland, 2005). Because many of these policies are already included in the European Code for Smoke free Hospitals (see the appendix), we focus our attention on strategic and structural policy solutions to improve tobacco control in Catalan hospitals.

Policy Proposals

The *first proposed policy solution* is to create an officially independent institution that evaluates tobacco control activities according to the law and the ENSH standards in all public and private hospitals. This institution should verify accurate interpretation of the law and verify whether smoke-free areas are respected in hospital settings. That is, it should include both compensation and coactive measures. Among the compensation measures, this agency could reward hospitals according to the number of patients assisted and target groups aided. Among the coercive measures, hospitals that break the rules could be charged fines, have their quality score reduced, and have their financial aid cut off.

This agency should be funded by Catalan government. That agency could be the Catalan Network, because it has rich knowledge and experience in this area. This independent organization should establish diverse mechanisms to evaluate the activities such as information management systems, evaluation surveys, and inspection visits. The main benefits of this policy solution are that it allows each hospital to be responsible for the implementation of the ENSH policies and permits a high level of independence and autonomy according to the hospital's characteristics. However, as some theorists point out, institutional polices should be well formulated, framed, and consolidated to avoid any level of inoperativeness or ambiguity (Dorfman, Wallack, & Woodruff, 2005). To evaluate a good level of success, some indicators should be reported to the government agency that supports and controls the project. As suggested by Meyers, instrumental mechanisms are required to describe how policies are transformed (Meyers, Glaser, & Donald, 1998). At the same time, this policy solution includes some risks by overemphasizing hospitals' autonomy, which might lead to further divergent measures among hospitals that would not facilitate the coexistence of diverse programs from site to site.

The *second proposed policy solution* is to create two groups in each hospital: a decision making or "steering" group composed of management, staff members, and patients/hospital users; and an implementation group that would execute and monitor the resolutions taken by the decision-making group. For the purpose of this article, we will focus on proposals for the decision-making group, because the "collective level" in which rules and norms are created is particularly important. In this regard, some of the group's decision-making responsibilities should be (a) to redesign and frame the policy problem adequately, (b) to design incentives addressed to get people involved, (c) to select the most suitable implementation group, and (d) to decide surveillance and monitoring measures (e.g., make hospital security guards responsible for ensuring the compliance with the nonsmoking rule and require management to audit patient records to determine if smokers have been correctly advised of the tobacco-free policies and assisted with referrals to cessation programs). The primary advantage of this policy solution is that tobacco control policies would be developed as strong, solid, and focus-oriented institutional goals.

In addition, because internal policies must be coherent with an organization's culture, a high level of cooperation between individuals is also necessary to promote tobacco-free hospitals. Nonetheless, this second policy solution guarantees neither agreement with the project nor a change in inadequate behavior. Health professionals' involvement is vital in offering patients tobacco cessation counseling (Miller, 2006). As some researchers have suggested, policy changes should be consonant with the values of implementing actors (Dorfman et al., 2005). For that reason, as mentioned before, motivational strategies and media campaigns in favor of the smoke-free message are essential to help and promote this cultural change. Although this section has presented two proposed policy options related to the strategic and structural solutions, these changes should be accompanied by motivational efforts. For instance, building a motivational campaign that increases employees' motivation and commitment is crucial to attaining strong employee engagement. The challenge is to create an environment in which the staff members share the same goal. In this regard, some identified effective

approaches tested in the organizational theory, including identifying the employee's priorities, soliciting their feedback on the issue, designing an integrating project, launching inclusive and educative media campaigns, communicating clear workplace policies, enforcing the norms, periodically evaluating successes, and reporting accomplishments (Birkland, 2005; Scott, 1966, 1987).

In fact, motivational, structural, and strategic strategies should be implemented concurrently to increase the involvement of key hospital personnel. In this regard, we believe that these two proposed solutions would help empower individuals by increasing their engagement with the policy and to obtain their commitment.

Contribution of IAD Framework to Understanding Tobacco Control in Catalan Hospitals

The IAD framework is helpful in examining how hospitals address planning, implementing, and enforcing tobacco control programs and how the rules are adopted by the diverse actors. Additionally, the IAD can identify the factors that influence institutional design, the characteristics of the system, the culture of the individuals (hospital workers and management), and organizations attempting to solve the problems that are embedded within. One of the most useful facets of IAD for the analysis of tobacco control policies in hospitals is its description of how rules are created and used in institutions. However, assuming that individuals contribute to seek better common outcomes and that some kind of culture is shared in institutions and is reproduced through common beliefs, attitudes, and behaviors, we are concerned with how the rules are developed. The IAD provides at least three areas in which to rethink the formation of rules and norms.

First, although we often take for granted that all the participants have a common understanding of the policy, protocols, and structure of the organization, there is evidence that behavior varies in the absence of well-established rules (Ostrom, 2000). A review of the implementation of tobacco projects offers some examples that suggest how tobacco consumption among health professionals leads to lack of tobacco cessation intervention in practice (Cerrada Cerrada, Lopez Olmeda, Bouzas Senande, Gomez Rodriguez, & Sanz Cuesta, 2005; Sarna et al., 2000) and less adherence to smoke-free policies (Martinez et al., 2008).

Second, hospitals as organizations also show a distinctive commitment to implementing the policies, the development of which depends on the actors within the institution. However, if the management group does not include a well-established policy that embraces all levels of staff, it will be very difficult to ensure that these rules are understood and followed. Because rules are settled in the decision-making stage (collective level) and applied on a day-to-day basis (operational level), it is necessary to develop clearly written internal tobacco control polices to avoid confusion and misinterpretation of the regulations. We believe that writers of the institutional tobacco control policies should include the roles of all individuals within the organization.

According to the "Stay Free Project," a tobacco control program based on the recommendations of the Tobacco Cessation Treatment Guide (Fiore, Jaén, & Baker, 2008), there are three barriers to implementing cessation activities in hospitals. These are (a) the lack of management support, (b) the limited education and skills of health professionals in tobacco cessation, and (c) the absence of systematic protocols for interventions (Miller, 2006). These difficulties match those observed in the Catalan hospitals. In this sense, the institutional culture in tackling other issues is also important, because it legitimates the authority of the institution in confronting organizational challenges. If the individuals who comprise an organization cannot rely on their management and superiors, it will be very difficult to put any sort of policy into practice. Finally, it is important to take into account how the message is developed, framed, and disseminated. For this reason, it is essential to work with an organizational cultural change point of view when attempting to implement a new policy that requires some sort of participation.

As we have observed, the IAD framework helps identify many of the factors that shape the success of policies in an organization (communication, information, resources, and rules and norms) and how these are implemented in a desirable and expected way.

The evidence of tobacco-related damage coupled with the approval of FCTC (Shibuya et al., 2003) has shaped a new international scenario with the endorsement of new national tobacco regulations in many countries, including Spain (Joossen & Raw, 2007; WHO, 2008). The national law provides that regional health departments are responsible for implementing tobacco control regulations (LEY 28/2005). Because the Spanish health system is complex and includes diverse organizational levels (from the regional administration to the hospital ward) and diverse institutional actors (from the policy maker to the patient), some control mechanisms should be provided to guarantee compliance with the standards. However, although the Spanish law includes penalties, it lacks clear surveillance and monitoring mechanisms. The law fails to introduce means to ensure both organizational and individual involvement. In addition, it fails to establish a minimum level of tobacco cessation activities at hospitals. As the IAD literature suggests, less constrained situations yield to weaker inferences and predict irregular and poor outcomes (Ostrom, 2000). Consequently, if Catalonia continues promoting a "non-bylaw"—that is, a noncompulsory regulation—projects such as the Catalan Network, without more formal organization, clear objectives, financing, and mechanisms to ensure accountability, will continue to be dependent on the cooperation of few motivated individuals. These individuals, frequently

the smoke-free hospital project coordinator, struggle with a lack of commitment from the hospital management and the noncooperation of their colleagues.

Thus, these elements require three urgent actions: first, the voluntary participation of hospitals in the smoke-free projects and programs; second, the establishment of written internal norms in hospitals that include the rights and obligations of all the actors; and third, ensuring sufficient resources to facilitate the implementation of these programs.

After examining efforts to achieve smoke-free hospitals in Catalonia, we can affirm that the overall strength of the IAD framework lies in its potential to contribute to detailed organizational analysis to improve capacity-building among actors of different levels.

On the other hand, the IAD may not explain many other mechanisms that affect the creation of institutional rules. In a complex scenario such as the one presented here, diverse rules coexist in the same institution. In simple organizations, a smaller number of rules are at play. In addition, although analysts might be able to describe many rules, not all the individuals follow the same rules. Although the IAD framework helps understand institutions, it does not provide a guide as to which rules are better than the others in analyzing social dilemma.

Conclusions

Applying the IAD framework in a multilevel tobacco control scenario helps explain the failures and challenges of policy design and implementation. Among the failures, we found that relying on the organizations' interpretation of the rules leads to discretionary and inconsistent implementation. Among the challenges, according to this case study, there are two necessary policy solutions. First, to incentivize and control the tobacco control activities at each hospital level through an officially independent institution that evaluates tobacco control activities. Second, to establish by law clear, strong, and compulsory national or regional regulations that should be in coordination with the task already undertaken by the Catalan Network.

Appendix

European Code and Standards of Smoke-Free Hospitals

Commitment
Engage decision makers. Inform all personnel and patients.
Communication
Appoint a working group. Develop a strategy and an implementation plan.
Education and Prevention
Set up a training plan to instruct all staff on how best to approach smokers.

(continued)

Appendix (continued)

Identification and Cessation Support
Organize cessation support facilities for patients and staff in the hospital and ensure continuity of support on discharge into the community.
Tobacco Control
Indicate smoking zones clearly for as long as they are considered necessary and keep them away from clinical and reception areas.
Environment
Adopt appropriate signage, including posters, signposts, and so on and remove all incentives to smoke (such as ashtrays, tobacco sales).
Healthy Workplace
Support systems are in place to protect and promote the health of all those who work in the hospital.
Health Promotion
Promote smoke-free actions in the community setting.
Compliance Monitoring
Renew and broaden information to maintain commitment to the policy. Ensure follow-up and quality assurance.
Policy Implementation
First convince. Then constrain considering legislation if needed. Have patience!

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Note

1. A social dilemma is a paradox that commonly results from collective action. It is defined by two properties:
   a. Each person has an individual rational strategy that yields the best payoff in all circumstances (the noncooperative choice).
   b. If all individuals pursue this strategy, it results in a deficient collective outcome—everyone would be better off by cooperating.

   As Ostrom mentions (1998), social dilemmas are called by many names, including the public-good or collective-good problem, the free-rider problem, moral hazard, the credible commitment dilemma, and so on. However, she uses the works of Dawes (1975, 1980) and Hardin (1971) to use in the rational choice theory.

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Bio

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10.2.2 Artículo Anexo 2

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Editorial

Recintos hospitalarios sin humo: un desafío para el control del tabaquismo

Smoke-free hospital campus: The next challenge for tobacco control in Spain

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Nadie discute en la actualidad que los hospitales deben ser un ejemplo en promover entornos sin humo, y tomar la iniciativa en la aplicación de políticas de control de tabaquismo dirigidas a sus pacientes, visitantes y trabajadores[1,2]. Entre los beneficios de los espacios sin humo destacan la reducción del consumo de tabaco y la preparación para motivar el abandono entre los fumadores[3]. Por todo esto se inició hace ya más de una década el movimiento de "hospitales sin humo" en España, caracterizado por una acción concertada entre los diferentes profesionales y colectivos del centro hospitalario. En este modelo, los miembros del equipo directivo, los líderes sindicales y los líderes profesionales desempeñan un papel ejemplarizador. El modelo se basa en la creación de un comité promotor que se encarga del seguimiento y divulgación del progreso y fases del proyecto entre los trabajadores y, finalmente, de evaluarlo mediante estudios del cumplimiento, encuestas de opinión y satisfacción sobre el proyecto y prevalencia de tabaquismo en los trabajadores del hospital[4]. En este contexto, la constitución de redes regionales, nacionales e internacionales de "hospitales sin humo" ha contribuido decididamente a la progresión del proyecto[5].

Durante la década de 1990, el objetivo de los hospitales fue conseguir edificios interiores sin tabaco y extender otras actividades de control del tabaquismo en el hospital, como la formación de los profesionales en consejo y tratamiento del tabaquismo, programas de deshabituación para trabajadores y usuarios o actividades comunitarias de prevención, en colaboración con escuelas y asociaciones del entorno del hospital. En pocos años, el paradigma de los espacios sin humo se puso al alcance y el contexto acabó de ayudar. En España existe cada vez más consciencia social sobre el problema sociosanitario que el tabaquismo conlleva[6]. Hemos mejorado en el ranquin europeo de "control global del tabaquismo" del puesto 26 (año 2005) al 12 (año 2007), de 30 países[7,8]. La Ley 28/2005 de medidas sanitarias frente al tabaquismo tiene mucho que ver con esta mejora global[9,10], también en el ámbito de los hospitales y servicios sanitarios[11–13]. En primer lugar, por el debate social y la concienciación colectiva previos a la entrada en vigor de ésta. Y en segundo lugar, porque la ley prohíbe la venta y el consumo de tabaco y hace desaparecer los espacios de fumadores en nuestros centros sanitarios, con la única excepción, recogida en una disposición adicional, de los centros, servicios o establecimientos psiquiátricos, en los que "se podrán habilitar zonas para los pacientes a quienes, por criterio médico, así se determine"[10]. Los hospitales se han convertido en espacios libres de humo *casi* al 100%. Bien es cierto que aún existen incumplimientos, con el subsiguiente riesgo de incendio, de graves consecuencias y difícil justificación.

No obstante, y a pesar de los beneficios obtenidos tras la implantación del proyecto de espacios sin humo en los hospitales[5,13], la disminución de la prevalencia del consumo en los hospitales es lenta y su apoyo es irregular[14,15]. Entre las diversas razones que explican este comportamiento destaca la capacidad de los fumadores de salir a las zonas externas del hospital[16,17]. Puesto que los hospitales suelen contar con recintos externos, se hace necesario también considerar estos espacios en la política de control del tabaco del hospital. Con un entorno sin humo se potenciaría al máximo una cultura sanitaria libre de tabaco y el abandono del consumo entre los profesionales, pacientes y visitantes. Los beneficios y justificaciones de los recintos hospitalarios sin humo son múltiples. En primer lugar, protegen la salud de los no fumadores (en España mueren cada año alrededor de 2.000 personas que nunca han fumado debido al humo ambiental del tabaco)[18] y disminuyen las oportunidades para fumar[3,19]. Además, favorecen lugares de trabajo más sostenibles por la reducción de gastos de mantenimiento y limpieza derivados de la recogida de colillas, y más seguros por la eliminación del riesgo de incendio.

El paradigma en los hospitales norteamericanos y europeos hace ya unos años que está cambiando. La Joint Commission estadounidense que en 1992 pedía edificios sin humo aconseja ahora avanzar hacia recintos sin humo (*smoke-free campus* en su terminología). Aunque no sea obligatorio, el 45% de los hospitales estadounidenses tiene recintos completamente sin humo[20] y la Red Europea de Hospitales sin Humo ha adoptado los recintos sin tabaco como estándar máximo de calidad[21].

En nuestra opinión, el recinto hospitalario sin humo es una meta cercana, aunque siempre habrá quien mantenga que es inalcanzable. En otros países se han implementado edificio y recinto hospitalario sin humo al mismo tiempo[22]. Otros hospitales

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han seguido una estrategia en 2 etapas: primero conseguir un edificio sin humo para extenderlo después al recinto. La mayor parte de los hospitales españoles han superado la primera etapa, con la excepción de aquellos con prestaciones de salud mental que mantienen salas de fumadores para estos usuarios. Por lo tanto, trabajar en primera instancia para consolidar el edificio sin humo, incluyendo la desaparición de salas o espacios de fumadores en los servicios de salud mental, debería estar a nuestro alcance a corto plazo[23]. En este sentido, ya se dispone de una guía europea que se ha traducido y adaptado a nuestro contexto para facilitar la progresiva transformación de las dependencias de salud mental en lugares sin tabaco[24].

La segunda etapa, de avance hacia recintos hospitalarios sin humo, está más cercana de lo que parece. En esta etapa se cuenta con 2 posibles abordajes. Una estrategia es la declaración del recinto sin humo sin excepciones, previo trabajo y consenso, y tras establecer mecanismos de vigilancia. Esto implica, por ejemplo, que las personas que deseen fumar tienen que salir de los límites del recinto del hospital. Puede implicar también la prohibición de fumar con ropa de trabajo y el control de las idas y venidas a fumar. Otra estrategia transitoria consiste en declarar el recinto libre de humo con la excepción de uno o 2 puntos de fumadores exteriores. Estos puntos deben estar preferentemente en zonas alejadas de las puertas o accesos y debidamente señalizados. Este tipo de solución conlleva cierto peligro, ya que puede convertirse en un obstáculo a medio plazo en el avance hacia el recinto hospitalario completamente sin humo.

Los hospitales con recintos sin humo pueden convertirse en ejemplo que se debe seguir respecto a control del tabaquismo en otros sectores empresariales, de servicios y en la comunidad en su conjunto. Se deben promover hospitales completamente libres de humo sin excepciones, ni en los servicios de salud mental ni en ningún área al aire libre de los recintos, ya sean patios internos, balcones, terrazas o espacios cubiertos (con marquesinas o toldos). Las evidencias de los beneficios de los espacios sin humo son inapelables; se cuenta con una ley favorable y un contexto social y profesional adecuado para dar el paso.

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