

MODELOS DE FINANCIACIÓN DE LA PATOLOGÍA DIGITAL

Marcial García Rojo
Hospital de Jerez. Cádiz. España
Vicepresidente
Sociedad Española de Informática de la Salud



Introducción

- El presupuesto de un servicio de anatomía patológica apenas llega al 1% del total de un hospital.
- Un servicio con un presupuesto anual total de 500.000 euros necesita adquirir y mantener equipamiento por encima de 300.00 euros

Proyectos de digitalización total y microscopios virtuales

- 1997. Proyecto Telepath. Universidad de Alabama en Birmingham. Microscopio virtual: imágenes seleccionadas de 1,4 MB
- 1998. Hospitales Johns Hopkins y Universidad de Maryland. Cada preparación: 5-10 GB (comprimido).

JPG, FlashPix, **wavelets** (Saltz, 1997; Wang-JZ, 1999)

Desde 2002

<http://www.seap.es/telepatologia/>

Omnyx Integrated Digital Pathology new high volume scanner achieves CE Mark in the European Union

Chalfont St Giles – 18 June 2014– GE Healthcare today announced that the Omnyx™ Integrated Digital Pathology (IDP) solution with the new VL120 high volume scanner has acquired the CE Mark for primary diagnosis in the European Union under the 'In Vitro Diagnostic Devices Directive'. The Omnyx™ IDP solution has been developed by Omnyx LLC, a joint venture of GE Healthcare and University of Pittsburgh Medical Center (UPMC).

In 2013, Omnyx™ IDP solution was approved for routine diagnostic use with the Omnyx™ VL4, a slide scanner designed for lower volume uses. This solution is installed at customers in Switzerland, Spain and the UK. Now the new high volume scanner will give histopathologists even greater speed and efficiency to scan slides, create case files and manage their workflow. Mamar Gelaye, CEO of Omnyx, said: "Most care pathways for patients rely on access to efficient and expert pathology services – from initial diagnosis, assessing progress and ongoing monitoring. Yet to date we have seen little investment in technology to empower histopathologists – who examine tissue slides. Traditionally, pathologists examine tissue slides under a microscope. Slides have to be transported to pathologists, or pathologists have to travel to other laboratories, creating delays in diagnosis and risk of slides being damaged or lost. This makes collaboration with and access to subspecialists more difficult.



eHEALTH SUMMIT
EUROPE
11-12 MAY 2015
RIGA, LATVIA

IN CONJUNCTION WITH
eHealth WEEK
LEARN MORE -



Philips Digital Pathology Solution Receives CE Mark for Diagnosis to Help Advance Oncology Diagnosis

Monday, 20 October 2014

Royal Philips (NYSE: PHG, AEX: PHIA) has acquired the CE mark for diagnostic use of its Philips Digital Pathology Solution. European pathologists will now be able to use the full digital solution as an aid in diagnosis for routine pathology, such as primary diagnosis of oncology.



With the aging population and the increasing knowledge of the complexity of cancer cases, improving the efficiency and quality of cancer diagnostics has become a critical concern. By digitizing the images pathologists normally view through a microscope, Philips' solution offers high-quality images that could enable a more objective and quantitative diagnosis than currently possible. These digital images could also enable new ways to mine information from tumor tissue for further data analysis. Additionally, enhanced collaboration capabilities may speed up consults and second opinions which could improve diagnostic confidence.

"Pathologists play a critical role in the increasing demand for cancer diagnosis and care, and digital pathology looks promising in its ability to support faster, more confident diagnosis," said Perry van Rijnsingen, General Manager of Philips Digital Pathology Solutions. "Helping improve workflows and collaboration could increase efficiency and productivity, and we believe that digitization will arm pathologists with the resources they need to successfully improve diagnostics."

The CE mark includes diagnosis for routine pathology including Hematoxylin and Eosin (H&E), Immunohistochemistry (IHC) and special stained tissue sections.

Through the Digital Pathology Solution, Philips strives to enable a faster and simplified n-receives-ce-mark-for-diagnosis-to-help-advance-oncology-diagnosis-ology labs more efficient. The



Discover more about our

Estudios de coste efectividad

J Pathol Inform

Editor-in-Chief:

Anil V. Parwani,
Pittsburgh, PA, USA

Liron Pantanowitz,
Pittsburgh, PA, USA

OPEN ACCESS
HTML format

For entire Editorial Board visit : www.jpathinformatics.org/editorialboard.asp

Research Article

Can Digital Pathology Result In Cost Savings? A Financial Projection For Digital Pathology Implementation At A Large Integrated Health Care Organization

Jonhan Ho, Stefan M. Ahlers¹, Curtis Stratman², Orly Aridor³, Liron Pantanowitz⁴, Jeffrey L. Fine⁴, John A. Kuzmishin¹, Michael C. Montalto², Anil V. Parwani⁴

Department of Dermatology, School of Medicine, University of Pittsburgh, ¹International and Commercial Services Division, UPMC, ²Omnyx LLC, Pittsburgh, ³Office of Sponsored Programs and Research Support, University of Pittsburgh Medical Center, UPMC, ⁴Department of Pathology, School of Medicine, University of Pittsburgh, Pittsburgh, PA, USA

E-mail: *Jonhan Ho - hoj@upmc.edu

*Corresponding Author

Received: 28 March 14

Accepted: 22 June 2014

Published: 28 August 2014

Ahorros potenciales en 5 años para 219.000 estudios / año (20 hospitales)

Productividad y organización

- Mejora en productividad de patólogos (13%)
- Mejora en circuitos: carga de trabajo más equilibrada
- Menor nº de segunda opinión (50%)
- Más productividad TEAP
- Centralización de técnicas
- Evitar mensajería
- No invertir en microscopios

Mejor diagnóstico y tratamiento de cáncer

- Evitar errores de diagnóstico que lleven a tratamiento no adecuado (melanoma y carcinoma de mama, y extrapolado a otros 10 tumores)

Ahorro: 12,4 millones USD

+ Ahorro: 5,4 millones USD

Métodos/supuestos

Table 1: Acquisition of WSI scanners and workstations and anticipated adoption rates: 5-year roll out plan

Quantity/cost category	Year 1	Year 2	Year 3	Year 4	Year 5	5-year total
WSI scanners (no)	14	3	1	3	0	21
Pathologist workstations (no)	23	18	12	12	0	65
Average utilization of WSI systems (%)	24	53	69	90	90	-

WSI: Whole slide images

Resultados (eficiencia y productividad)

Table 4: Productivity savings: 5-year roll-out (in \$ thousands)

Efficiencies/savings	Year 1	Year 2	Year 3	Year 4	Year 5	5-year total
Efficiencies						
Pathologist clinical FTE capacity gain						
Productivity	2.2	4.7	6.0	7.7	7.7	-
Level-loading	0.3	0.6	0.7	0.8	0.8	-
Reduction of internal consults	0.1	0.3	0.4	0.5	0.5	-
Total pathologist clinical FTE gains	2.6	5.6	7.1	9.0	9.0	-
Histotechnologist FTE capacity gains						
Total histotechnologist FTE gains	0.0	2.3	5.5	8.0	9.1	-
Productivity and consolidation savings (\$)						
Pathologist capacity monetized ^a	833	1764	2221	2884	2906	10,608
Histotechnologist labor-lab consolidation	-	136	321	469	536	1462
Microscopes-avoided purchases	35	36	76	79	82	308
Total productivity savings	868	1936	2618	3432	3524	12,378

^aBased on avoided hiring for growth and attrition. FTE: Full time equivalent

Table 8: Digital pathology use case: Total cost savings (in \$ thousands)

Operational savings (\$)	Year 1	Year 2	Year 3	Year 4	Year 5	Total 5-year
Productivity	868	1,936	2,618	3,432	3,524	12,378
Quality/better medicine	44	327	1,014	1,984	1,984	5,353
Total savings	912	2,263	3,632	5,416	5,508	17,731

Centros de referencia

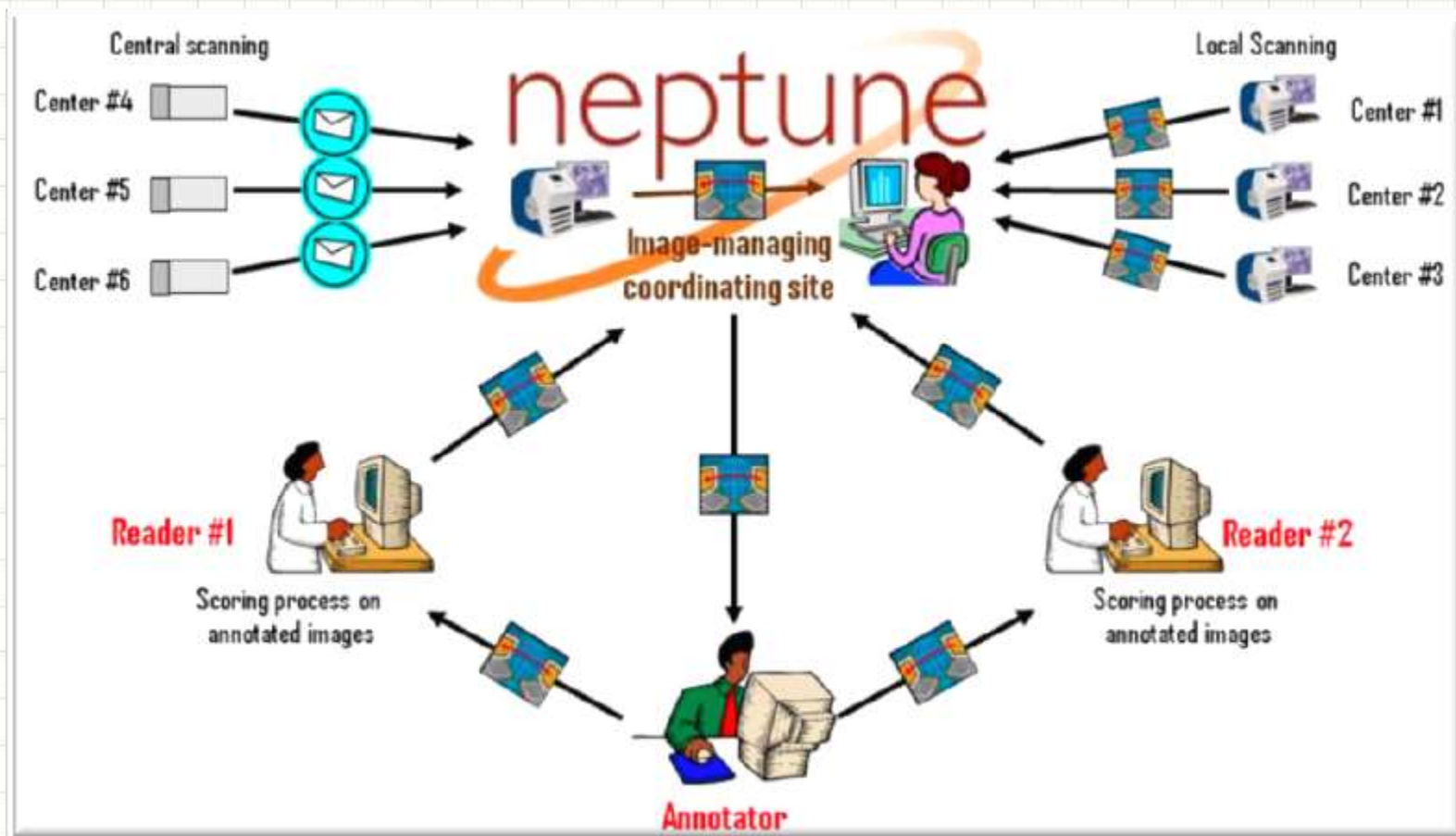


Table 3. Advantages and limitations of digital pathology

Advantages	Limitations	Limitation Significance
Cost abatement with time and multiple use of same cases	Initial costs	Major
Permanent library of images and data	Additional quality control processes and backups required	Major
Reduced amount of technical personnel time	Trained personnel required	Major
Reduced amount of study coordinator time	New protocol formulation for acquisition	Minor
Better use of professional time	New protocol formulation for assignment and retrieval	Minor
Financially conservative webinar meeting	New protocol formulation for annotation and scoring	Minor; all studies require protocol development
Anytime/anywhere model	Additional training of pathologists	Minor
Multiple users at the same time	Quality Internet connection is essential	Minor
Reduced loss or damage of mailed pathology material	Systems used within the same study need to have interface capabilities	Major
Full transparency for other investigators or regulatory agencies	Limited capabilities of Z-stacking to only a few instruments	Minor
View of multiple slides at the same time	Co-registration of >4 sections is difficult or impossible	Minor
Reduced intra-and inter-reader variability	Users may not all have the same comfort level with whole slide imaging	Minor
Ability to annotate digital images	Software for tracking and audit trails are necessary	Minor

Costes a considerar

- Escáner y hardware (estación de trabajo): 200.000 USD
- Coste adicional de software (p. ej. análisis de imagen), mantenimiento y soporte hdw y sfw: 15-20% del coste inicial / año (40.000 USD /año)
- Escanear y organizar las preparaciones digitales y personal de apoyo (40.000 USD /año):
 - Tiempo de escaneado
 - Gestión de información
 - Gestión de preparaciones (s/t si es centro de referencia)

¿Qué ahorramos con patología digital?

- Correo, mensajería
- Coordinación técnica y de registro de estudios (para estudios multicéntricos)
- Reuniones vía web (webinar) que evitan desplazamientos para reuniones de consenso
- Evita hacer nuevos cortes (optimiza el tejido)
- Evita posible pérdida de datos
- Permite reutilizar los mismos casos de referencia

Comparación de costes en reuniones de consenso

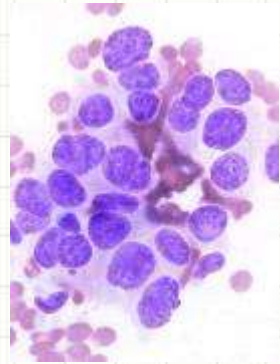
Table 4. Panel review methodologies: Cost and issues

Review	Costs (\$)	Comment
Digital review		Does not include cost of database
Scanning costs	12,000	Enables intraobserver and interobserver review
Shipping costs	3,000	Fixed cost regardless of the number of pathologists
Total	15,000	
Consensus panel review		Challenging to schedule
Travel cost	9750	Does not allow intraobserver and interobserver studies
Microscope rental	2500	Strong consensus approach
Shipping cost	3000	
Total	15,250	
Round-robin review		Not widely used because of inefficiencies of time, and concerns over lost material
Shipping cost	9000	
Total	9000	

Costs are calculated on cost of review of 100 cases, reviewed by a panel of 10 pathologists. We estimated 10 slides per case, and a rate of 50 cases per day reviewed per day in consensus review model. Shipping costs are an average estimated cost. Hotel cost is current *per diem* for Baltimore, Maryland, where the NEPTUNE meetings are held, and airline airfares plus ground transportation to and from the airport and /or parking are estimated at \$450 per round trip.

Propuestas

1. Mejora (“I+D”) en concursos de reactivos
2. Instrumental necesario en concursos de reactivos
3. Lotes específicos en concursos de reactivos
4. Concurso/contrato público para compra de equipos (4 o 5 años, con extensión de 2 años)
5. Concurso/contrato público para provisión de servicios
6. Proyecto nacional o regional



1. Mejora (opcional) en un concurso público

- Concurso de reactivo. Agrupación/Lote X. “Inmunohistoquímica”: El sistema de detección de inmunohistoquímica incluye los anticuerpos primarios, ..., incluida la instrumentación....

Se valorará (puntuación) disponer de:

- Sistemas de digitalización de imágenes, escáner, análisis de imagen...

2. Instrumental necesario en un concurso público

- Concurso de reactivo. Agrupación/Lote X. “Inmunohistoquímica”: El sistema de detección de inmunohistoquímica incluye los anticuerpos primarios,, incluida la instrumentación....

La presente agrupación debe incluir, además de los equipamientos descritos:

- Sistemas de digitalización de imágenes, escáner, análisis de imagen...

3. Lotes específicos en concursos de reactivos

- Lote ZZ. Sistema de digitalización de preparaciones histológicas y CITOLÓGICAS:
 - Volumen a escanear
 - Criterios de calidad y resolución
 - Análisis de imagen (TMA, biomarcadores)
 - Renovación tecnológica
 - Mantenimiento
 - Integración con PACS
 - Integración con S.I. de anatomía patológica

4. Compra de equipos

2014. NHS. Normanton, UK. 'Pathology Microscopes Slide Scanning Equipment and Associated Accessories'

Lot 1 - Pathology Microscopes and Associated Accessories; which are instruments for use in a clinical laboratory environment for looking at tissue or cells at a microscopic level.

Lot 2 - **Slide Scanning Equipment and Associated Accessories**; which is a system device or solution for digitising pathology and produces a 'virtual slide' for viewing and analysis with any associated accessories. Suitable for use primarily in a clinical laboratory. **Precise quantities are unknown.** It is anticipated that initial expenditure will be in the region of 1 125 000 GBP to 1 250 000 GBP in the first year of this Framework Agreement however this is approximate only and the values may vary depending on the requirements of those bodies purchasing under the Framework Agreement. The estimated value over the total Framework Agreement term (including extension options over the term) is in the region of 4 500 000 GBP to 5 000 000 GBP.'

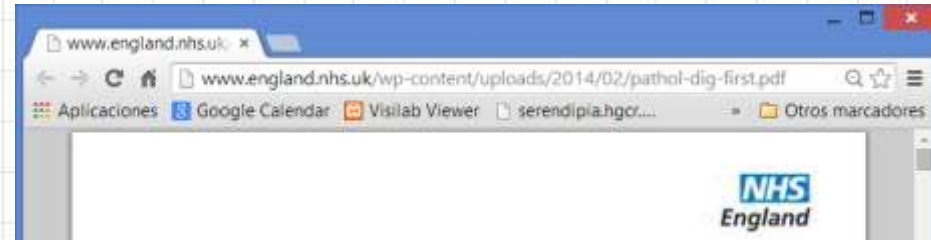


5. Provisión de servicios

Red nacional en Canadá

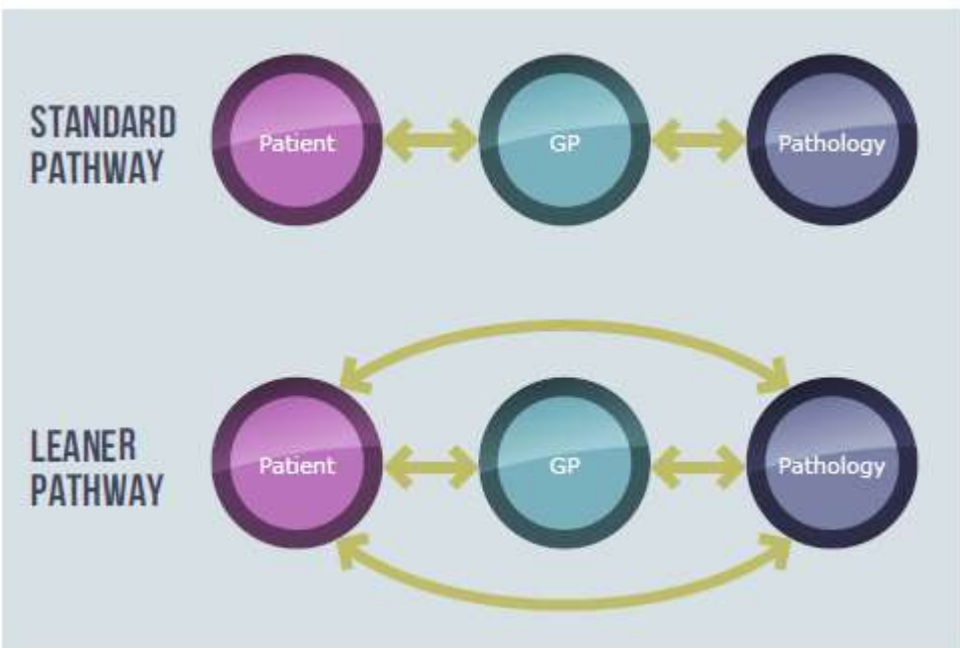
Toronto. The purpose of this Request for Proposals (RFP) is to invite Bidders to submit their Proposals for the provision of the MJT Solution including hardware, software, and professional services with ongoing system support and operations as described within the RFP.

6. Proyecto nacional (2014)



PATHOLOGY SERVICES + DIGITAL INNOVATION = SERVICE TRANSFORMATION

**QUALITY OUTCOMES
INNOVATION
PATIENT-CENTREDNESS
EFFICIENCY
PATIENT SAFETY**



This block contains a collage of images and text. At the top left, a blue box contains the text 'Digital First: Clinical Transformation through Pathology Innovation'. To the right is a photo of a man in a hospital bed. Below these are two more photos: one of a nurse attending to an elderly patient, and another of a nurse holding a young child. At the bottom right is the NHS Constitution logo, which features a stylized family icon and the text 'THE NHS CONSTITUTION'.

Convencer de los beneficios

Virtual pathology

Digital pathology promises great improvements in delivering patient care, including faster test results and ease in seeking a second opinion. With the use of virtual microscopes this is now becoming possible.



Complexity

High

Outcomes

- Faster transmission of cases between centres (eg. for review at multidisciplinary team meetings)
- Facilitates remote working (eg. providing specialist services at remote sites, such as neuropathology, transplant pathology or frozen section diagnosis)
- Improved safety and efficiency
- Accuracy equal to conventional microscopes
- Easier access to specialist review
- Potential improvements to laboratory efficiency including administrative and medical time

Proyectos nacionales o regionales

- 2007. Castilla-La Mancha: Serendipia (3,5 M euros). Aperio, Aurora
- 2009. Quebec. Canadá (\$ 1,428,000). Hamamatsu, Aurora
- 2012. University Health Network. Toronto. Ontario Multi-Jurisdictional Telepathology (MJT) Project. Pan-Canadian Digital Pathology Network (\$ 3,080,270). GE Health care, Agfa HealthCare
- 2013. Telepathology network in Ile de France Region (piloto). Tribvn, Orange
- 2014. Newfoundland and Labrador Telepathology Project (\$ 1,398,750). GE Healthcare - Omnyx



Fases del proyecto (SESCAM)

CITI 2005, Concurso público: 2007

- Crear repositorio **central** de imágenes médicas
- Contemplar el almacenamiento de ficheros de **gran tamaño**
- Adaptación de imágenes para integrarlas en PACS (estándar **DICOM** de Imagen Digital y Comunicaciones en Medicina)
- Utilizar visor **estándar** para trabajar preparaciones virtuales (no depender de fabricantes)
- Ayuda al diagnóstico: Análisis de imagen automatizado

Ejemplo concurso público compra y servicio 4 a 5 años

- Title: T.0444 Digital Pathology Solution. Published by: NHS Wales Procurement Services
- Publication Date: 25/09/2014
- Abstract: The NHS Wales Shared Services Partnership (NWSSP), hosted by Velindre NHS Trust, invites interested Bidders to tender for the **provision of a Digital Pathology Solution**, specifically an automated Slide Scanner complete with Pathologists Workstation / software (that can be **integrated with the host Laboratory Information Management System** – Intersystems Trakcare Lab), Virtual Image Management, Operational and Imaging Archive, Training, Maintenance and Support.
- The initial call off order will be raised for Betsi Cadwaladr University Health Board (BCUHB) BCUHB will enter into a contract with the successful provider for a period of **five (5) years** with an option to extend for a **further two (2) years**. Up to **twelve consultants** will each need a virtual image reporting set up, eight at the central location, with a two based at each of the remote sites. [...] The **main benefits anticipated will be improved all round efficiency** resulting in flexibility in working patterns together with the concurrent **reduced movement of glass slides**.
- Estimated total value of purchases for the entire duration of the framework agreement: Between 500,000 and 2,000,000 Currency: GBP
- Award Criteria: Lowest Price: No / The most economically advantageous tender in terms of Criteria as stated in contract documents:

Ejemplo concurso público compra

- Intraoperative Digital Pathology Diagnostic Service
- Sheffield Teaching Hospitals NHS Foundation Trust
- Scanning of frozen section microscope slides, including accessing of images via local area network connection for delivery of rapid intraoperative histological diagnostic service.
Sheffield Teaching Hospitals requires the provision of a microscope slide scanner and associated hardware and software, to allow rapid scanning and access to the stored images across a local area network by at least 5 individuals simultaneously.
A high capacity and throughput are not essential - a **small capacity** slide scanner will suffice provided that it offers rapid scanning. A **low rescanning rate** is essential and continuity of feed compatible with delivery of intraoperative diagnostic service would be an advantage. The scanner should be suitable for **placement within a laboratory** environment. Storage for up to **450 images per year** over an assumed lifetime of 5 years is optional.
- This contract is subject to renewal: no

Contratos de riesgo compartido

- Acuerdo que distribuye los riesgos asociados a resultados entre las partes.
 - Garantía de resultados, mejora clínica, efectividad comprobada
- Ambas partes consiguen sus objetivos
 - Financiador: ventajas para los pacientes con el nuevo método
 - Industria: elude el riesgo de exclusión de los canales públicos, puede planificar la comercialización, costes y beneficios.

Medir

Seguimiento

Contratos de riesgo compartido

Caso Velcade

- El acuerdo:
 - Johnson & Johnson propusieron al Gobierno Británico en 2007, pagar por un medicamento para el cáncer (bortezomib – Velcade) pero sólo para aquellos pacientes que se beneficiaran del medicamento (que puede costar 48.000\$).
 - El acuerdo permite a los pacientes que demuestren una respuesta positiva total o parcial al medicamento, seguir con el tratamiento y que este sea financiado íntegramente por el SNS.
 - La compañía J&J reembolsa el dinero de aquellos paciente que no hayan mejorado lo suficiente después del tratamiento: Pay for performance.
- A qué pacientes se dirige:
 - Pacientes en primer estadio que ya han sido tratados antes y que no son indicados para un trasplante de médula.

Nuevos modelos de contratación

Riesgo compartido y retorno de la inversión

- Telemedicina es un sector muy atomizado en el que las grandes empresas dominan el mercado, ya que el principal demandante lo constituyen las administraciones e instituciones públicas, que suelen preferir contratar a grandes empresas que son capaces de compartir riesgos y ofrecen mayor flexibilidad en cuanto a modelos de retorno. En este escenario, las pymes y start-ups tienen una supervivencia complicada

Ana Torrejón Beldad

Responsable de Innovación y Transferencia Tecnológica. Parque Científico de Madrid.

I+S 2013; 101: 24-26

Conclusiones

1

- La inversión en patología digital puede justificarse no sólo asistencial sino económicamente

2

- Lo idea es la compra de servicios a largo plazo y no de equipamientos que puedan quedar obsoletos

3

- Hay nuevos modelos de contratación que debemos valorar

¿PREGUNTAS?

marcial@seis.es

III Curso de Patología Digital

Jerez de la
Frontera, Cádiz
26-28 de noviembre 2014

SEAP-IAP
Sociedad Española de Anatomía Patológica e Histología

Club de Patología Digital de la SEAP
www.conganat.org