



## Virtual Consultation System

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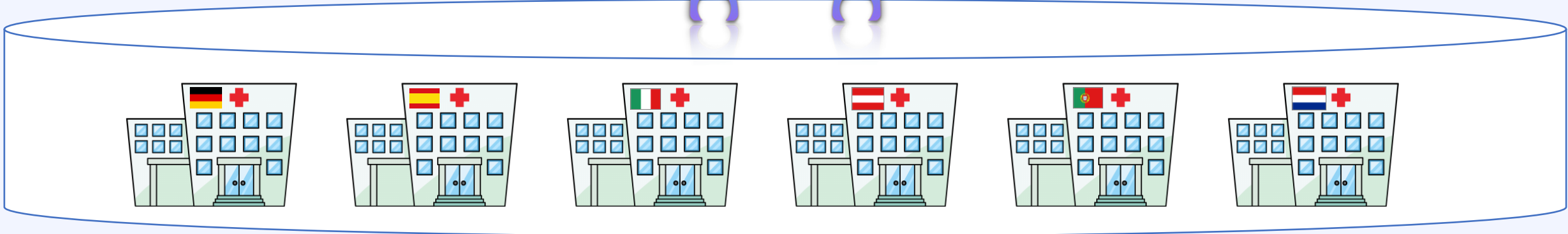
**PAST CHAIR OF THE SIOPEL GROUP**

**(INTERNATIONAL CHILDHOOD LIVER TUMORS STRATEGY GROUP)**





**The web system supports researchers in management of complex clinical cases through online consultations among experts world-wide and integrates tools for Tumor Board review**



# Features

Collaborative review of clinical cases with the possibility to share images in high quality, providing a tool for easily transfer files of big size



The logo features six circular icons of doctors on the left. To the right, the text reads: **VCS** Virtual Consultation System Case Consultation & Tumor Board.

# SIOPEL in Europe



- Norway
- Sweden
- Denmark
- UK
- Ireland
- The Netherlands
- Poland
- Belgium
- France
- Czech Republic
- Switzerland
- Hungary
- Spain
- Italy
- Greece
- Serbia & Montenegro
- Slovak Republic
- Turkey



The first Consultation System was realized in 2004 for Siopel 4 - High Risk Hepatoblastoma in Children

Stage (PRETEXT) (automatic assigned):		PRETEXT IV						
Patient Risk Category		HR (Calculated by the system)						
Request for rapid radiology review to determine Risk Category		Yes						
Baseline radiology review		Yes						
Description:								
<p><b>Images Upload:</b> You can upload images now or later in Radiology Review Section at Main Menu</p> <table border="1"> <tr> <td>1</td> <td>Image file:</td> <td> <a href="#">Explore Image</a> <a href="#">View Image</a> <a href="#">Save Image</a>            C:\Documents and Settings\sscalise\D\Sfoggia...            HEPA2.JPG         </td> </tr> <tr> <td colspan="2">Send by FedEx</td> <td></td> </tr> </table> <p style="text-align: right;"><a href="#">Another image</a></p>			1	Image file:	<a href="#">Explore Image</a> <a href="#">View Image</a> <a href="#">Save Image</a> C:\Documents and Settings\sscalise\D\Sfoggia... HEPA2.JPG	Send by FedEx		
1	Image file:	<a href="#">Explore Image</a> <a href="#">View Image</a> <a href="#">Save Image</a> C:\Documents and Settings\sscalise\D\Sfoggia... HEPA2.JPG						
Send by FedEx								
Send		Cancel						

[Home Page](#)





# History

## Reviews

### Number of inserted files by study

	Pathology	Radiology	Audiology
Siopel 4	32	88	NA
Siopel 6	23	151	515

# Children's Hepatic Tumor International Consortium (CHIC)

Memorandum of  
Understanding  
Los Angeles  
March 2011

**CINECA**  
Consorzio Interuniversitario

**CHILDREN'S  
ONCOLOGY  
GROUP**

The world's childhood  
cancer experts



**GP  
OH**



## – CHIC International Dataset for Hepatoblastoma Steering Committee

- Meyers, Malogolowkin, Lopez-Terrada, Krailo..... COG
- Czauderna, Aronson, Perilongo, Maibach..... SIOPEL
- VonSchweinitz, Haeberle, Schmidt, Leuschner.....GPOH
- Hiyama, Hishiki, Watanabe, Tanaka, Yoshimura.....JPLT
- Derosa, Rinaldi, Ortali, Saraceno.....CINECA





# History

## CHIC PROJECT

Children's Hepatic tumors International Collaboration

MULTI-CENTER TRIAL	REVIEWED CASES	TOTAL IMAGES	TOTAL CASES
P9645	156	357	277
SIOPEL 3	14	191	406
JPLT 2	15	209	298
INT0098	0	0	170
HB 99	8	59	141
SIOPEL 2	0	0	135
JPLT 1	0	0	106
HB 89	6	42	72
<b>Total</b>	<b>199</b>	<b>858</b>	<b>1605</b>



- VCS should be easily adjustable to large networks, with several experts from various time zones.
  - There should not be any need to gather experts simultaneously at one time, even virtually. System should be conveniently accessed at any time from anywhere with a laptop and Internet connection.
- Experts should be able to devote as much their time as necessary to get familiar with cases and to formulate opinions, providing the consultation time frame is observed.
- Potential conflicts of expert opinions should be resolved and final recommendations should be provided in a coordinated manner.
- Large number of audience should have an opportunity to learn from closed cases which are kept as e-learning repository.



## Moderator(s)

Is responsible for **the approval of the cases** and checks the cases for completeness, **forwards the case to competent panelists**, ensures review/closure of cases in timely fashion, **summarizes recommendations**



## Panel Leader(s)

Expert of a specific discipline that **facilitates discussions through panelists** and **provides consensus** who is responsible for the scheduling of the web meetings if required and validates the preliminary conclusions



## Clinician(s)

**Compiles the e-CRF of the case** registration and submits the related supporting documents, including **diagnostic images**



## Panelist(s)

Is an expert involved in the review process and **compiles review e-CRFs**



# VCS: Important Legal Features

- Disclaimers:
  - Clinician must actively attest to patient being ineligible for existing cooperative group trial
  - Clinician must actively attest to having obtained consent / assent from patient / its legal guardians
  - Clinician must acknowledge that opinion **does not** constitute a formal consultation prior to receiving case review and that ultimate medico-legal responsibility remains with treating clinician
- Disclaimers have been consulted and approved by European and US lawyers

① Clinician sends a new case through the platform

② Case ID



Clinician



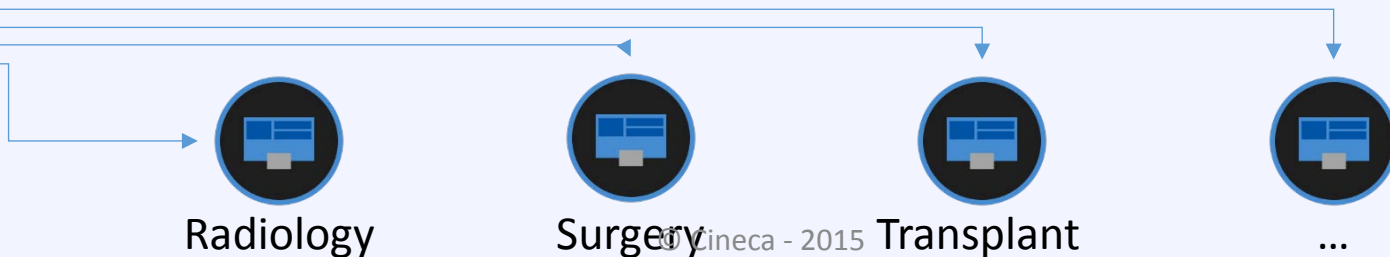
Is generated and used for all notifications

③



Moderator verifies the case submission and **can assign** the case to one or more panels of different disciplines or **can ask** the submitting clinician for more information

Case

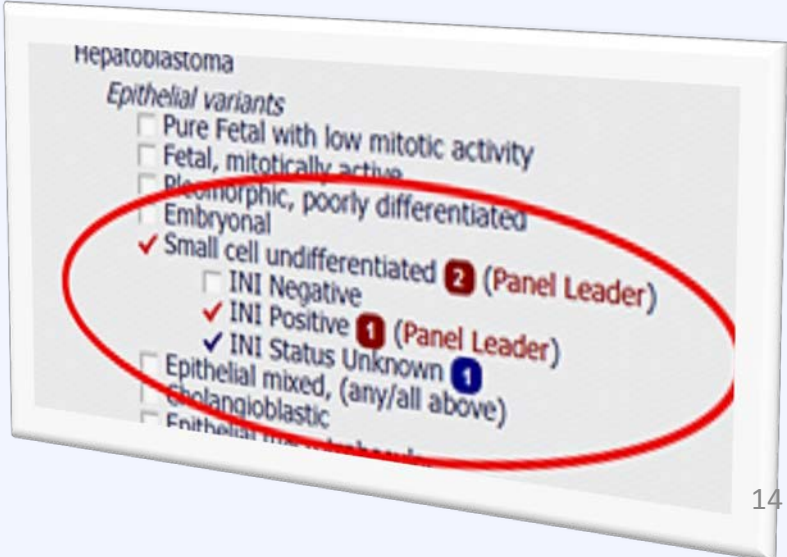


Panels

④ Each panelist receives a notification and can review the case and its documents



⑤  Panel Leader collects all reviews within the panel and sends the preliminary conclusion to the Moderator



⑥

**Moderator writes the final conclusions and send the case back to the submitting clinician**



Each step of the flow is fully customizable accordingly to specific needs of the network



# Modules

Structured Data

Review Engine

Diagnostic Image  
Server - Viewer

Web Conference  
Manager

# Virtual Consultation System

Flow Manager

Consensus  
Diagnosis

Clinician  
Registration

Big File Client

# Modules

Structured Data

Review Engine

Diagnostic Image  
Server - Viewer

Web Conference  
Manager

- Consultation process is automated and done largely through electronic Data Capture Forms (eCRFs)
- The integrity and completeness is ensured with automatic consistency and quality checks

Flow Manager

Consensus  
Diagnosis

Clinician  
Registration

Big File Upload

# Modules

Structured Data

Review Engine

Diagnostic Image  
Server - Viewer

Web Conference  
Manager

- All steps and discussions are tracked and monitored
- Capacity for limited review (by selected discipline / disciplines) or full review
- Experts can participate simultaneously or individually for the review of the case

Flow Manager

Consensus  
Diagnosis

Clinician  
Registration

Big File Upload

# Modules

Structured Data

Review Engine

Diagnostic Image  
Server - Viewer

Web Conference  
Manager

- Each image is automatically anonymized and can be viewed with an integrated **DICOM browser** for radiology and **virtual microscope** for pathology without quality loss
- Patient data and images are stored in a database through a secure web infrastructure for research/training/elearning

Flow Manager

Consensus  
Diagnosis

Clinician  
Registration

Big File Upload

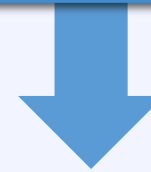
# Modules

Structured Data

Review Engine

Diagnostic Image  
Server - Viewer

Web Conference  
Manager



- The tool is fully integrated with a videoconferencing system (Adobe Connect or other systems compliant with standard API) for Tumor Board functionality

Flow Manager

Consensus  
Diagnosis

Clinician  
Registration

Big File Upload

# Modules

Structured Data

Review Engine

Diagnostic Image  
Server - Viewer

Web Conference  
Manager

- Consultation process is completely managed through the website and final opinion is sent back to the requesting physician through the platform
- Can manage case follow-up to monitor adherence to advice



Flow Manager

Consensus  
Diagnosis

Clinician  
Registration

Big File Upload



# Modules

Structured Data

Review Engine

Diagnostic Image  
Server - Viewer

Web Conference  
Manager

- Customized disease-specific Consensus Diagnosis Form (CDF)
- Individual Review Form (IRF)

Flow Manager

Consensus  
Diagnosis

Clinician  
Registration

Big File Upload

# Modules

Structured Data

Review Engine

Diagnostic Image  
Server - Viewer

Web Conference  
Manager

- Registration page for clinicians in order to verify institutional role and obtain user and password to access VCS

Flow Manager

Consensus  
Diagnosis

Clinician  
Registration

Big File Upload

# Modules

Structured Data

Review Engine

Diagnostic Image  
Server - Viewer

Web Conference  
Manager

- Large files images (radiology, pathology slides) can be easily uploaded through a Big File Client with images compression without quality loss and linkage to the case clinical data

Flow Manager

Consensus  
Diagnosis

Clinician  
Registration

Big File Upload

A large, solid blue arrow pointing upwards, positioned above the 'Big File Upload' button, indicating the flow of data from the upload module to the other system components.

## Structured data

REGISTRATION FORM

Age (Months)\* 11

Gender\* Male

What question would you like us to help you answer?

Urgent request? No

PLEASE PROVIDE THE FOLLOWING INFORMATION ABOUT YOUR PATIENT:

Diagnosis\* Hepatoblastoma

PRETEXT at Diagnosis\*

Macrovascular Involvement (On Imaging)\* No

Intra-abdominal / Extrahepatic Disease\* No

Multifocality\* Yes

Tumor Rupture at Diagnosis\* Unknown

COG Stage at Diagnosis\* Stage I

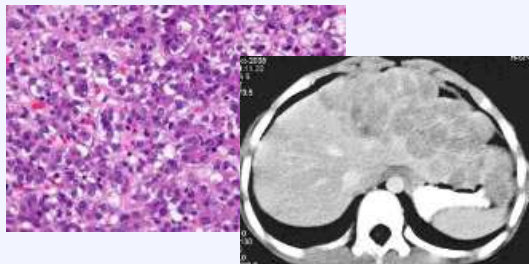
Initial AFP at diagnosis\* Elevated

## Videoconferencing



## Email alerts

## Diagnostic images web viewer

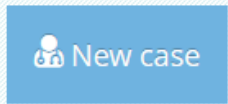
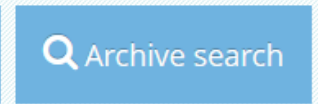



## Storage

## Consensus of diagnosis

- Hepatoblastoma
- Epithelial variants*
- Pure Fetal with low mitotic activity
  - Fetal, mitotically active
  - Pleomorphic, poorly differentiated
  - Embryonal
  - Small cell undifferentiated **2** (Panel Leader)
    - INI Negative
    - INI Positive **1** (Panel Leader)
    - INI Status Unknown **1**
  - Epithelial mixed, (any/all above)
  - Cholangioblastic
  - Epithelial macrolobular



## Actions

## Profile

Institution: **Seattle Grace Hospital** User: **Mario Rossi**

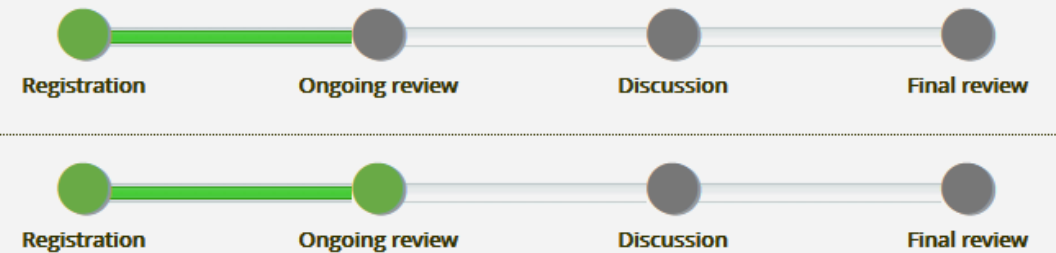
Profile: **Clinician**

CCF#	Submitting Clinician	Request Date	Patient	
↑ ↓	↑ ↓	↑ ↓	↑ ↓	
6	CLINICIAN_01	2015-09-17	Male (24 months)	
5	MODERATOR_02	2015-07-29	Male (15 months)	

Total Number of Cases: 2

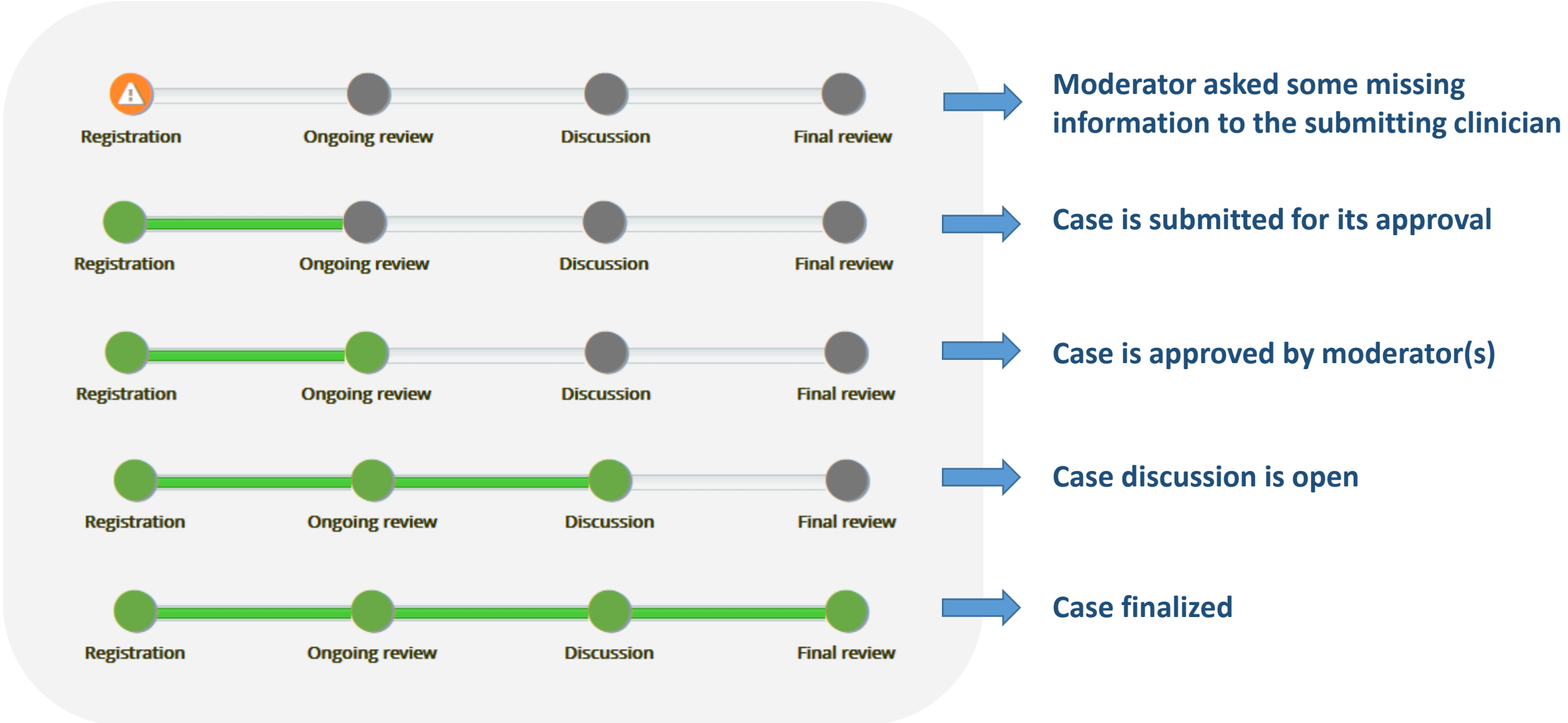
## Case summary

### Review Flow




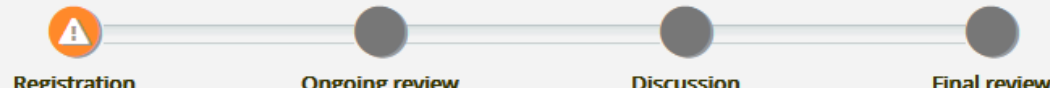
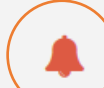










## Progress Bar

# Case Progress Bar





New case registration Search To create/join a meeting

CCF#	Submitting Clinician	Request Date	Patient	Review Flow
9	MODERATOR_01	2015-09-28	Male (38 months)	  Registration      Ongoing review      Discussion      Final review
8	SARACENO	2015-09-23	(26 months)	   Registration      Ongoing review      Discussion      Final review
7	MODERATOR_01	2015-09-22	Male (15 months)	  Registration      Ongoing review      Discussion      Final review
6	CLINICIAN_01	2015-09-17	Male (24 months)	  Registration      Ongoing review      Discussion      Final review
5	MODERATOR_02	2015-07-29	Male (15 months)	  Registration      Ongoing review      Discussion      Final review
4	MODERATOR_01	2015-07-27	Female (44 months)	  Registration      Ongoing review      Discussion      Final review

Total Number of Cases: 8

1 2 >> |

# Functions

Meetings

New meeting

Title of meeting

Case discussion

**Title**

Case(s) to discuss

None selected ▾

**Case(s) to discuss**

Please choose a date/time in your local timezone:

**Date/Time**

Meeting duration

**Meeting duration**

Back

Schedule



# Webconference Manager

DICOM^CLEANED  
ID: NET.91.16  
TK JB/MM K  
20150723

26 Series

7 Imgs

AP

Zdj. Kl. Piersiowa AP

28 Imgs

2.5/5mm

35 Imgs

13 Imgs

Recon 2: 2.5/5mm

32 Imgs

Images: 10 / 35  
WL: 40 / WW: 90  
Thick: 2.50 mm Loc: 12.49 mm

Actions

Series

AH

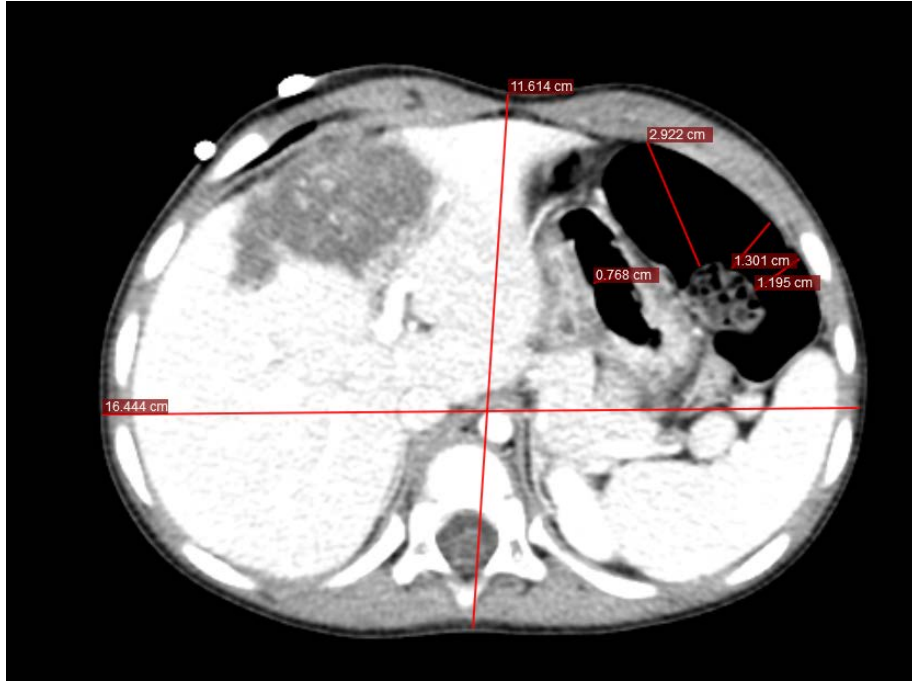
20150723  
TK JB/MM +K  
2.5/5mm

Selected Diagnostic Image

PF

Image size: 512 x 512  
View size: 1307 x 722  
Zoom: 141%

# DICOM Viewer



Measurement tool

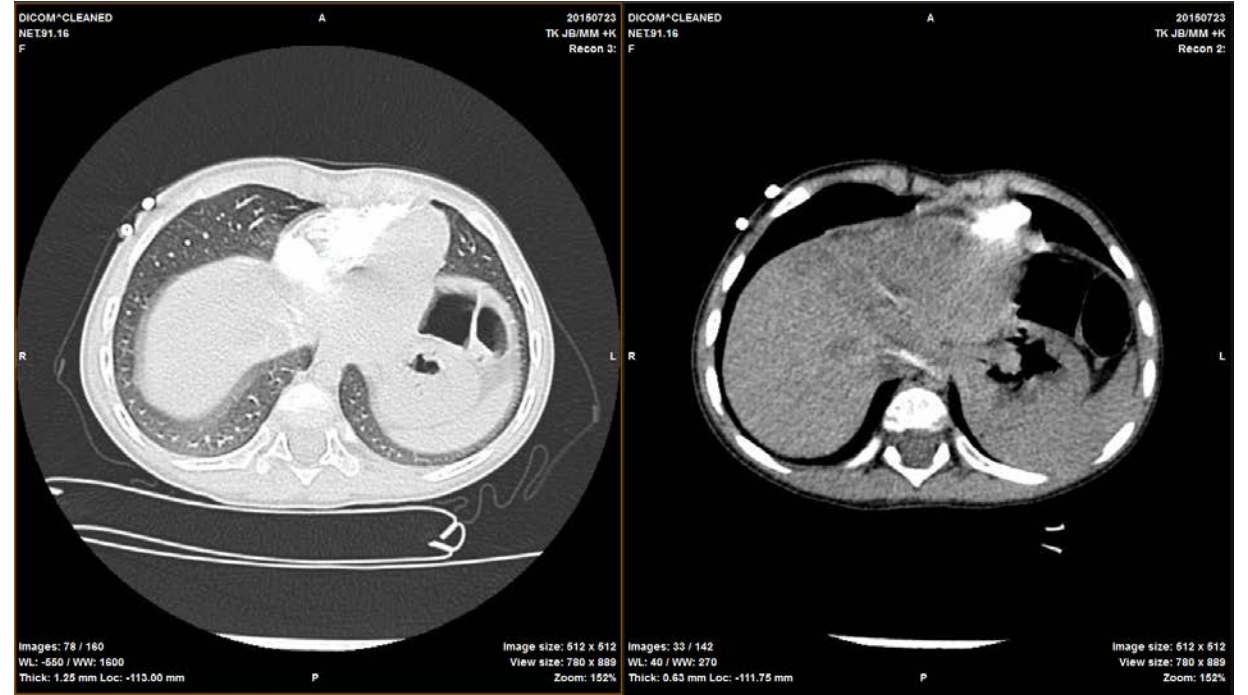
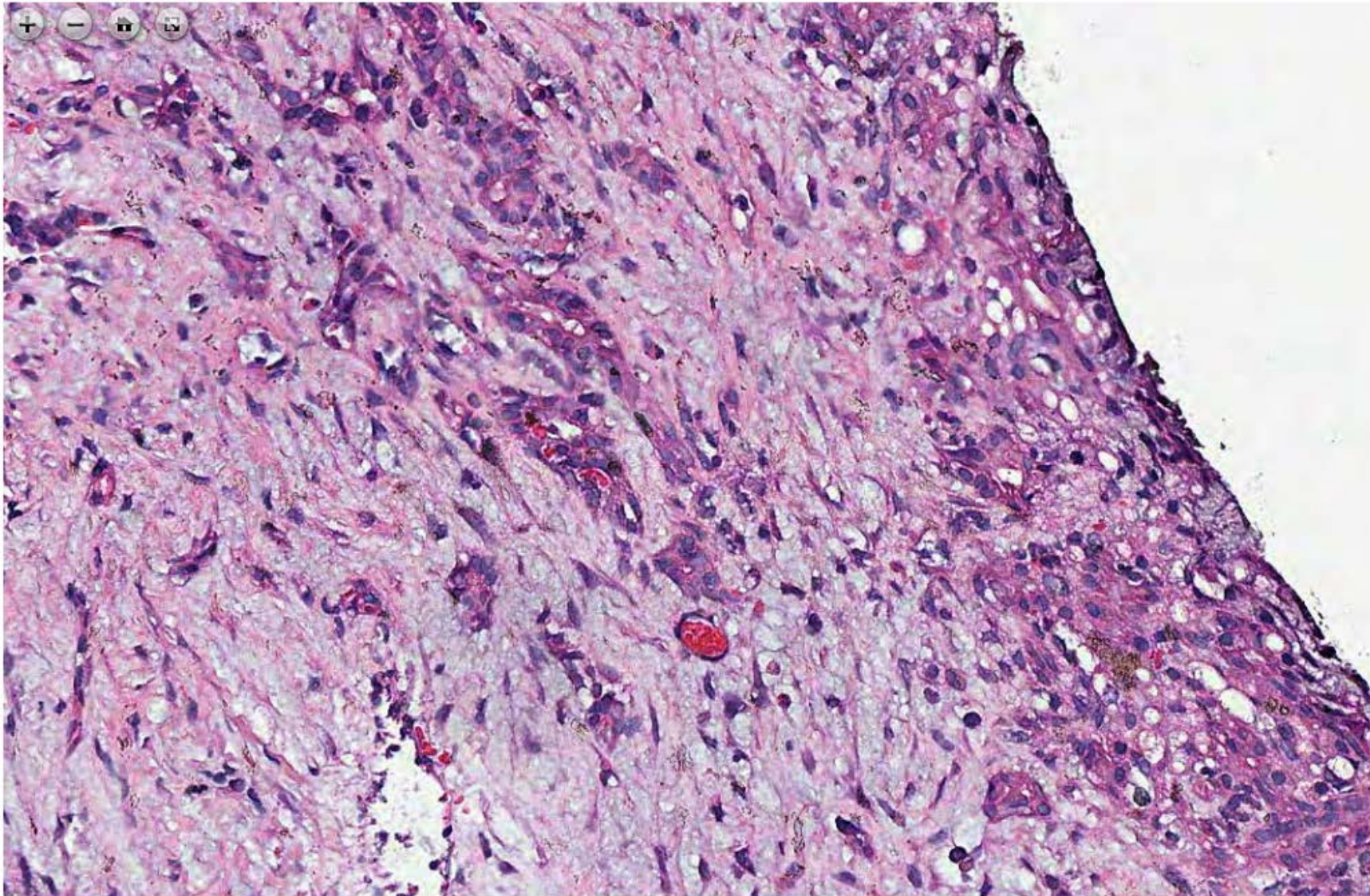


Image comparer

# DICOM Viewer





## Pathology Viewer

## SaaS model (Software-as-a-Service)

- Sustainability, centralized IT service, no local IT infrastructure needed
- Quality and security certifications provided by the hosting Data Center
- Data and images download at local level
- Data analysis through dashboard



## Virtual Appliance

- The application can be installed in any certified Data Center at local level

## Conclusions



Virtual Consultation System  
can be considered a very valuable tool  
for **case consultation and tumor board** where  
clinicians most need to share expertise and get  
consultation from other colleagues in different  
areas of the world in order **to facilitate access to  
the best expert care to all children** with cancer or  
rare disease in Europe **without travelling**





Thank you for your attention

