

Medizinische Qualitätskontrolle in der Teleradiologie: Erfahrungen aus 10 Jahren Pan-Europäischer Telemedizin

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TMC in a Nutshell

Telemedicine Clinic: a pan-European **Teleradiology** company providing **diagnostic reporting services 24/7/365** to **public hospitals in Scandinavia, UK and Spain**

Service offering

- Core: Sub-specialised diagnostic reporting and related services based on teleradiology: elective (MRI, CT, CR, PET/CT, Mammography, Ultrasound, DEXA) and oncall services.
- Additional value added services in Radiology: RIN (Radiology in Network™ consultancy services), Clinical Trials, Telepathology.

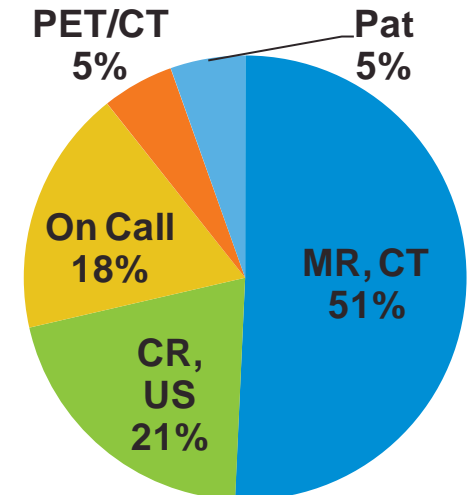
Human capital

- 96 sub-specialised full and part time Radiologists.
- 40 professional management team and staff members.

Offices

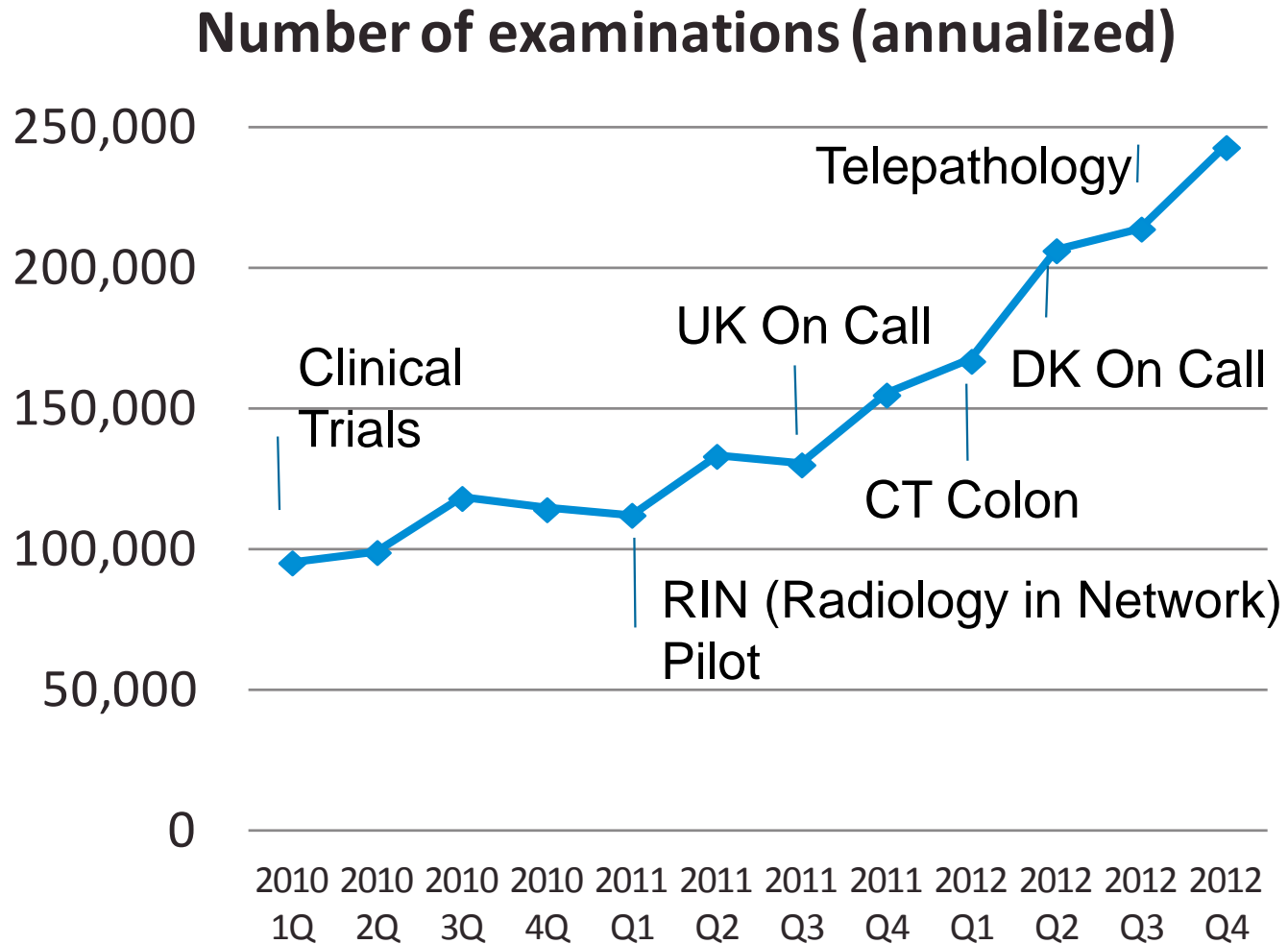
- Main diagnostic center: Barcelona, Spain.
- Oncall center: Sydney, Australia.
- Reporting hub: Gothenburg, Sweden.
- Market & Operations office: Reading/London, UK.

20.000 examinations reported monthly



Evolution of Reporting Activity 2010 – 2012

Continuous Innovation and Accelerated Growth



- It is not about Teleradiology versus “Conventional/Normal” Radiology
- It is about “Clinical” Radiology
- It is about Survival of Radiology
- Sub-specialised diagnostic reporting
- Super-specialised diagnostic reporting
- Network: Training / Knowledge Sharing / Reporting / Communication&Accessibility

Medical Quality Assurance at TMC: Service delivery strategy: ATA

Accuracy

- Strong internal **Medical Management** & Clinical Governance.
- Rigorous recruitment process with **test cases** for new Radiologists.
- **2nd reading environment with discrepancy handling.**
- Internal and external **audit**.
- **Appraisals** and **Professional Development** activities.
- Strong **Operations** department and **Quality procedures** based on ISO 9001 and 27001.

TAT

- Defined **objectives** (1h oncall, 24/48/72h elective) and achievement levels with continuous **performance tracking**.
- Optimized **reporting platform**: own RIS (TMC OPTEMIS) and PACS (Sectra) with desktop sync, voice recognition and dynamic worklists.
- Continuous improvement of reporting platform due to **own software development team**.

Accessibility

- **Knowledge sharing** activities internally & externally
- **Communication task** per section by phone, videoconference, Skype or GoToMeeting session.
- Defined procedure for “**request to speak to Radiologist**”.

Assessment of radiology imaging analysis and reporting performance

- The analysis and interpretation of the images and the report remains the core of radiology
- Analysis of the reporting performance has not yet been systematically addressed
- Electronic image management and reporting + Teleradiology: operational imperative and the technical means of systematically analyzing reporting performance

Current prevalence on 2nd readings a TMC

100%

- all modalities for Sweden elective cases
- all oncology cases for Denmark
- all new clients
- all new radiologists
- anytime a suspicion of a possible quality issue appears about any radiologist reports

2-10%

- all clients without a contractual requirement of 100% 2nd readings

Resulting average % of 2nd readings at TMC: **40%**

2. Medical Quality Assurance at TMC

Discrepancy handling in a routine 2nd reading environment

- 5 disagreement levels
- Based on the classification system used in the NHS

- | | | |
|---|-------------------------|--|
| 5 | - Full agreement | |
| 4 | - Minor disagreement | - very doubtful clinical significance |
| 3 | - Moderate disagreement | - possible clinical significance |
| 2 | - Major disagreement | - probable clinical significance |
| 1 | - Total disagreement | - almost certain clinical significance |

2. Medical Quality Assurance at TMC

TMC RIS: OPTEMIS

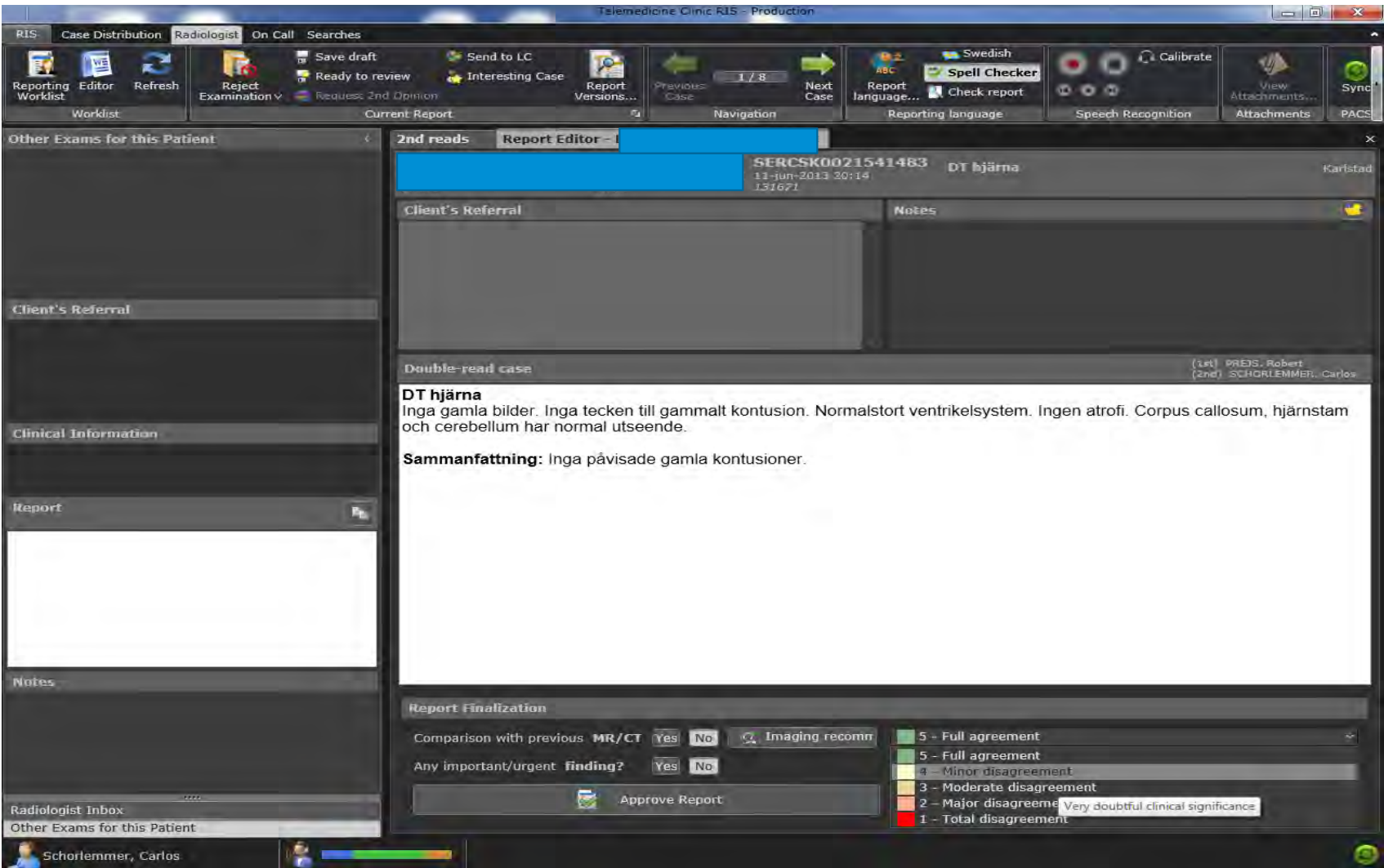
The screenshot displays the OPTEMIS RIS software interface. At the top, there is a toolbar with various icons for actions like 'Reporting Worklist', 'Editor', 'Refresh', 'Reject Examination', 'Save draft', 'Send to LC', 'Report Version', 'Previous Case', 'Next Case', 'Report language...', 'Spell Checker', 'Check report', 'Reporting language', 'Speech Recognition', 'View Attachments', and 'Sync'. Below the toolbar, the main window is divided into several sections:

- Other Exams for this Patient:** A sidebar on the left with a search bar and a list of exams.
- Client's Referral:** A section containing 'IMAGE NOTES' and 'Notes'. The 'IMAGE NOTES' section includes a referral date of 26/05/2013, priority of Routine, and a provisional diagnosis of 'Chr LBP, Sciatica left side, Disc herniation L4/L5 left side?'. The 'Notes' section contains 'Client's reporting instructions' and a note about mandatory clinical information for cross-sectional cases.
- Clinical Information:** A section providing a summary of the patient's history, including an RTA 15 years ago and severe LBP.
- MRI Spine Lumbar:** A section detailing the scan findings, such as 'Axial T2 weighted sequence is degraded by movement artefact' and 'The vertebral alignment is maintained'.
- Conclusion:** A section stating 'Early L5-S1 spondylotic changes' and 'No evidence of neural compression'.
- Report Finalization:** A section with dropdown menus for 'Comparison with previous: MR/CT' (set to 'No') and 'Imaging recoms' (set to '5 - Full agreement'). It also includes a 'Any important/urgent: finding?' section with 'Yes' and 'No' options.
- Approve Report:** A button at the bottom of the report editor.

At the bottom left, the user's name 'Schlorlemmer, Carlos' is visible. The bottom right corner shows a green 'Sync' button.

2. Medical Quality Assurance at TMC

TMC RIS: OPTEMIS



Version comparer

Compare	First Read	LOPEZ, Alexandra	22-may-2013 18:24	with	First Read	LOPEZ, Alexandra	22-may-2013 18:24
	Second Read	SCHORLEMMER, Carlos	23-may-2013 11:21		Second Read	SCHORLEMMER, Carlos	23-may-2013 11:21

Clinical Information

Low back pain referred to the right leg. History: significant back injury 3 years ago

MRI Spine Lumbar

Scanned from T11/12 to the sacrum.

Normal lumbar lordosis.

Minimal wedge-shaped morphology of the body of the T12 and L1 vertebrae, consistent with minor old compression fractures.

From T11/12 to L3/4, there are small Schmorl nodes at the endplates of the vertebrae.

At L3/4, there are moderate degenerative changes with dehydration of the disc, moderate bulging and facet joint hypertrophy. Small tear of the annulus. Minimal reactive intraosseous oedema at the inferior endplate to of the L3 vertebral body. There is mild to moderate stenosis of the right foramen with minimal impingement upon the right L3 nerve root. Possible spondylolysis/fracture of the pars interarticularis on the left side of the L3 vertebra. Mild stenosis of the left foramen without nerve root involvement.

No other foraminal stenosis. No spinal canal stenosis. Normal conus medullaris.

Conclusion

Minimal wedge-shaped morphology of the T12 and L1 vertebrae, consistent with minor old compression fractures. Small Schmorl nodes. Moderate degenerative changes at L3/4 with bulging of the disc, small tear of the annulus and facet joint hypertrophy. Minimal reactive intraosseous oedema at the inferior endplate to of the L3 vertebra. Mild to moderate stenosis of the right foramen with minimal impingement upon the right L3 nerve root. Possible old spondylolysis/fracture of the pars interarticularis on the left side of the L3 vertebra.

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Summary discrepancy data

- 2nd reads integrated into routine practice
- Time and cost effective 2nd reads
- Systematically analyse reporting performance

ALL COMPANY	Jan	Feb	March	April	Result 2013	KPI
Level 5	84.8%	83.4%	86.7%	89.1%	86.4%	80%
Level 4	12.2%	13.5%	10.0%	8.7%	10.8%	15%
Level 3	2.8%	3.1%	3.0%	2.1%	2.7%	4%
Level 2	0.2%	0.0%	0.2%	0.1%	0.1%	1%
Level 1	0.2%	0.0%	0.0%	0.0%	0.0%	0.00%

NEURO ALL	Jan	Feb	March	April	Result 2013	KPI
Level 5	82.8%	83.6%	89.5%	94.5%	88.6%	80%
Level 4	14.5%	13.9%	9.3%	4.7%	9.8%	15%
Level 3	2.5%	2.5%	1.2%	0.8%	1.6%	4%
Level 2	0.2%	0.0%	0.0%	0.1%	0.1%	1%
Level 1	0.0%	0.0%	0.0%	0.0%	0.0%	0.00%

MSK ALL	Jan	Feb	March	April	Result 2013	KPI
Level 5	88.9%	86.6%	89.7%	90.3%	88.9%	80%
Level 4	7.9%	10.0%	6.7%	6.7%	7.7%	15%
Level 3	2.8%	3.4%	3.3%	3.0%	3.2%	4%
Level 2	0.4%	0.0%	0.1%	0.1%	0.1%	1%
Level 1	0.0%	0.0%	0.1%	0.0%	0.0%	0.00%

BODY ALL	Jan	Feb	March	April	Result 2013	KPI
Level 5	81.5%	78.3%	78.8%	83.6%	80.8%	80%
Level 4	15.6%	18.6%	15.9%	14.0%	15.7%	15%
Level 3	2.9%	3.1%	4.7%	2.3%	3.3%	4%
Level 2	0.0%	0.0%	0.6%	0.1%	0.2%	1%
Level 1	0.0%	0.0%	0.0%	0.0%	0.0%	0.00%

2. Medical Quality Assurance at TMC

Individual disagreement data for each radiologist

Neuro Disagreements January 2012											
Dictated by	Total cases (Double Read)	Disagreements									
		5	%	4	%	3	%	2	%	1	%
AS	110	92	83,6%	17	15,5%	1	0,9%	0	0,0%	0	0,0%
CM	15	11	73,3%	4	26,7%	0	0,0%	0	0,0%	0	0,0%
CG	41	39	95,1%	2	4,9%	0	0,0%	0	0,0%	0	0,0%
HB	98	67	68,4%	22	22,4%	8	8,2%	1	1,0%	0	0,0%
JM	103	80	77,7%	14	13,6%	9	8,7%	0	0,0%	0	0,0%
JM	154	119	77,3%	31	20,1%	4	2,6%	0	0,0%	0	0,0%
KA	206	194	94,2%	9	4,4%	2	1,0%	1	0,5%	0	0,0%
MN	67	61	91,0%	4	6,0%	2	3,0%	0	0,0%	0	0,0%
MB	216	183	84,7%	26	12,0%	4	1,9%	3	1,4%	0	0,0%
PM	39	37	94,9%	1	2,6%	1	2,6%	0	0,0%	0	0,0%
PB	172	140	81,4%	28	16,3%	4	2,3%	0	0,0%	0	0,0%
PV	97	85	87,6%	9	9,3%	3	3,1%	0	0,0%	0	0,0%
SG	32	14	43,8%	17	53,1%	1	3,1%	0	0,0%	0	0,0%
SB	15	11	73,3%	3	20,0%	1	6,7%	0	0,0%	0	0,0%
SC	83	68	81,9%	11	13,3%	4	4,8%	0	0,0%	0	0,0%
ZK	12	10	83,3%	2	16,7%	0	0,0%	0	0,0%	0	0,0%
Totals	1501	1229	81,9%	220	14,7%	46	3,1%	6	0,4%	0	0,0%

2. Medical Quality Assurance at TMC

Evolution of the disagreement levels

ALL	2004	2012	KPI
Level 5	60,0%	85,7%	80%
Level 4	30,0%	11,1%	15%
Level 3	8,0%	3,0%	4%
Level 2	2,0%	0,2%	1%
Level 1	0,01%	0,01%	0,00%

2. Medical Quality Assurance at TMC

What have we done to decrease the disagreements between radiologists?

- Strong evaluation/selection process of new radiologists, including test cases
- Reporting standards
- Reporting guidelines
- Extended induction including 2nd reading
- Routine second reading
- Specific and regular feedback (monthly/yearly)
- Appraisals

Gold Mine of data

•Further objectives:

- Identify specific error types associated to reporting disagreements

- False Negative
- Misattribution
- Silly Mistake
- False Positive
- Other

- Identify where 2nd reads add value

- Identify areas of action
- Monitor effect of actions

Other objectives:

- Share our experience and results with the Health Care Community
- Teleradiology: recognized as a quality driven health care set-up

Abstract submitted to the annual Meeting of the ESNR , Frankfurt September 2013

Title

What is missed when reporting MRI lumbar spines – most common false negative errors and how to lower their incidence.

Purpose

Measure the prevalence and identify the most common types of false negative errors of MRI lumbar spine reports and suggest specific actions to be undertaken to lower their incidence.

Methods

As part of the quality assurance activity in our radiology department, we second read systematically and on a routine basis a significant percentage of all our radiology reports since 2004. The resulting discrepancies between the first and the second read are scored according to a 5-point scale. 5, full agreement; 4, clinically insignificant discrepancy; 3, possible clinically significant discrepancy; 2, probable clinically significant discrepancy; and 1, almost certain clinically significant discrepancy. Out of the collected discrepancy data, we have specifically extracted the false negative errors of the reports of 5947 double read outpatient MR lumbar spines done between January 2009 and April 2012. 20 radiologists highly experienced in MRI lumbar spine reporting have been included in the study.

Results

The discrepancy analysis revealed a prevalence of 2.3 % of significant false negative errors (discrepancy level 3 or below) and 31 different false negative error types. The 3 most common false negative errors involving the spine were missed disc hernias (28,5%), missed transitional vertebrae (12%) and missed spondylolysis (7%). The 2 most common false negative errors outside the spine were missed mass lesions of the pelvis (4.5%) and missed abnormalities of the kidneys (4%).

Conclusions

Out of a total number of 31 false negative error types of 5947 MRI lumbar spine reports the 5 most common represented almost 60%. Specific recommendations related to structured image analysis, structured reporting and RIS tools are given to lower their incidence.

Summary

- **Electronic image management and reporting + Teleradiology: operational imperative and the technical means of systematically analyzing reporting performance**
- **RIS tool enables second reading for quality control as part of routine practice**
- **Sytematic classification and analysis of discrepancies**
- **Analysis of data for research and quality improvement**

- It is not about Teleradiology versus “Conventional/Normal” Radiology
- It is about “Clinical” Radiology
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- Network: Training / Knowledge Sharing / Reporting / Communication & Accessibility

Thank you!

....please do not forget to assign your disagreement level to this presentation.

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