



# What can European radiologists learn from the outbreak of COVID-19 in China? A discussion with a radiologist from Wuhan

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Received: 17 March 2020 / Revised: 25 March 2020 / Accepted: 27 March 2020  
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*There is nothing to fear in life, you just have to understand everything. (Marie Curie)*

Andreas Gutzeit from Lucerne in Switzerland and Liang Wang from Wuhan in China are radiologists and friends. Since the beginning of their exchange during the coronavirus crisis in Wuhan, they have analyzed experiences from Wuhan together and believe that they could serve as a possible model for European radiologists. Prof. Wang was responsible from the very first hour for the radiology department as vice chairman for the clinical affair during the COVID-19 outbreak in Wuhan and now tries to help the European radiologists with his experiences in a joint discussion. The aim of this

**Electronic supplementary material** The online version of this article (<https://doi.org/10.1007/s00330-020-06841-6>) contains supplementary material, which is available to authorized users.

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communication is to determine what we can learn from the Chinese experience and how hospitals and radiology departments all around the world can prepare for a widespread outbreak of this disease.

On 31 December 2019, the World Health Organization (WHO) documented an outbreak of pneumonia of unknown etiology in the city of Wuhan, China [1–3].

Few days later, Chinese researchers identified a novel coronavirus (2019-nCoV) as the causative agent of the outbreak and the resulting disease was subsequently named COVID-19 [2]. The outbreak appears to be linked to a single or multiple zoonotic transmission events at a wet market in Wuhan where animals were sold [4].

On 31 March 2020, more than 750,890 people have been infected with the coronavirus and more than 36,405 people have died. While in many countries the numbers of new infections are increasing, the numbers in different Asian countries, namely China, seem to be stable or decreasing according to the COVID-19 Situation Report of the WHO on 31 March 2020. This article is not about telling radiology departments how to behave. We just want to show what has worked in the crisis situation in Wuhan.

If there is one positive thing about the COVID-19 outbreak, it is the insight that humanity can only solve today's complex problems through international collaboration. Scientists are particularly important participants of such discussions as they find solutions collaboratively based on scientific evidence and rational thinking.

## When did the first disaster trainings start within the hospital in Wuhan after the COVID-19 outbreak?

Wuhan hospitals started with comprehensive training for the whole hospital staff immediately after the COVID-19

outbreak. The entire staff of the hospitals were trained, including medical staff, administrative staff, and service departments (cleaning service, security, and others). The training content was standard prevention, personal protection, correct use of protective equipment, procedures to optimize putting on and removing protective equipment, hand hygiene, isolation measures, medical waste management, and air and environmental surface cleaning and disinfection. The training methods were on-site training and the recording of sample videos for e-learning purposes.

### **What kind of hospital management was in place in Wuhan during the crisis?**

The director of the clinical and medical technology department in Wuhan was the most important person during the coronavirus crisis. This person supervised prevention and control in the department, effectively played the leading role in the infection control group in each department, carried out critical self-assessment and self-correction, and timely identified problems and communicated them along with suggestions for improvement. Basically, there is no need for a director, but there is a need for a person or management team with medical and management experience to take responsibility and take decisions in difficult times.

The Hospital Infection Management established an inspection system to strengthen the guidance and supervision of the implementation of the clinical department's control measures and the correct wearing of protective equipment.

### **What were the management processes in radiology departments during the crisis?**

It was essential to avoid cross-infections. Every technician and radiologist in Wuhan was familiarized with the knowledge about prevention and infection control of the coronavirus situation.

The workplaces were divided into clear different zones to prevent transmissions. Leaving the critical zone with potentially infected patients was only allowed after standardized cleaning procedures and the removal of protective clothing and disinfection.

Despite possible impairment of scan and image quality, X-ray technicians required patients to wear protective equipment such as face masks during the examination.

The stay in the waiting room was reduced to a minimum. Patient crossing was reduced as much as possible and the distance between patients was more than 2 m.

Special times were reserved in the radiology departments for possible and confirmed COVID-19 patients, if the patients could not be separated due to lack of equipment or space. In

cases with enough radiology equipment and enough space, special imaging modalities were reserved for the patients with COVID-19 positive or unclear status. The examination room had to be temporarily vacated before the examination. After the examination, all the surfaces which the patient had been in contact with (including the floor) were disinfected. After training, the cleaning staff needed about 10 min for the standardized cleaning procedures.

### **Work in areas without confirmed COVID-19 patients**

In these areas, only patients with a negative COVID-19 test were examined, and only employees without any potential COVID-19 symptoms were allowed to enter these areas.

During the crisis in Wuhan, technicians, nurses, radiologists, and all other persons had to pay close attention to regular hand hygiene, wearing face masks (FFP2/filtering facepiece 2 respirator), protective clothing according to the protection requirements of class II environments, and removal of protective equipment after work. This was necessary in order to prevent the staff from getting infected in the course of the crisis and to avoid additional absences and shortage of staff.

### **Disinfection of computers, keyboards, and other equipment during the epidemic**

In Wuhan, desktop, computer, and intercom systems in the radiology departments were regularly cleaned after use with 250–500 mg/L chlorinated disinfectant or 75% (v/v) medical ethanol. The use of spraying devices was avoided to reduce the risk of damage to electronic equipment or provoking a fire hazard. This applied to the COVID-19-positive sections and the COVID-19-negative sections. For more information on the disinfection protocol, the readers are referred to the [Appendix](#). These are the experiences from Tongji University Hospital in Wuhan and not evidence-based.

### **How did Wuhan deal with the enormous quantities of potentially contaminated protective suits and equipment during the COVID-19 epidemic in the radiology departments?**

All wastes generated in the imaging procedures planned for COVID-19 were treated as medical waste. These were packed in double yellow medical waste bags, sealed, and removed from the examination room. The packaging bag was specially marked with infectious COVID-19 waste. The bags were sprayed from the outside with 2000 mg/L chlorine-

containing disinfectant and cleaned. The waste was then transported away by a transport vehicle and incinerated in a plant. The waste was not mixed with general medical waste and household waste.

## Conclusion

Wuhan and China cannot be compared with Europe in terms of society and infrastructure. The management processes during the COVID-19 outbreak, which are described here, were possible in Wuhan. We cannot judge whether this can be implemented in every hospital in Europe.

We expect an enormous increase of COVID-19 patients in the next weeks and months all over the world and also in Europe. If radiology departments want to think about whether their own plans are sufficient, they can compare them with the procedures in Wuhan.

We hope this will give our European colleagues the opportunity to learn how a national crisis has been successfully managed.

**Acknowledgments** We thank Prof. Liang Wang and his radiology teams and all our medical colleagues in China for the exchange of knowledge.

Prof. Liang Wang kindly offered his support to the radiology community and can be contacted via email (wang6@tjh.tjmu.edu.cn).

**Funding information** AG, QL, SM, and BL did not receive any funding for this work. LW received funding from the National Natural Science Foundation of China (#81171307, 81671656).

## Compliance with ethical standards

**Guarantor** The scientific guarantor of this publication is Andreas Gutzeit.

**Conflict of interest** The authors of this manuscript declare no relationships with any companies, whose products or services may be related to the subject matter of the article.

**Statistics and biometry** One of the authors has significant statistical expertise.

No complex statistical methods were necessary for this paper.

**Informed consent** Written informed consent was not required for this study because there are no patients included.

**Ethical approval** Institutional Review Board approval was not required because there are no patients included.

## Methodology

- Rapid communication

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