

# National Quality Improvement Conference

## An Audit of unnecessary pre-operative Chest X-Rays in a tertiary centre in Singapore

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### Problem Statement

Pre-operative Chest X-Rays (CXR) are often cited as an area of overuse; however we are not certain of its extent or the driving factors for it. This poster discusses an audit of pre-operative CXRs which were taken for patients undergoing elective surgeries in Singapore General Hospital (SGH), a single tertiary centre in Singapore, and a survey conducted amongst clinicians in Singapore on their perspectives on unnecessary investigations that do not contribute to improved patient outcomes.

### Project Aim

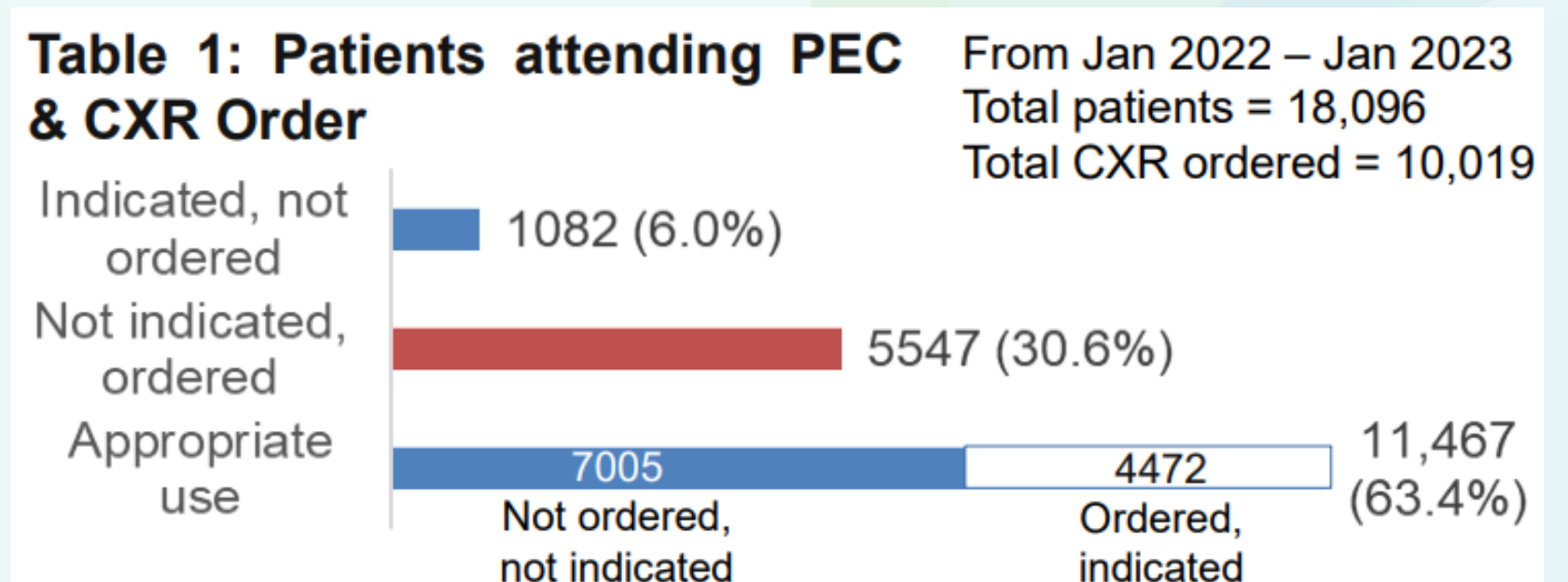
The combined qualitative and quantitative data aims to establish the extent of healthcare overuse and elucidate the barriers and enablers specific to the ordering of unnecessary pre-operative CXRs, with the purpose of creating a robust implementation plan uniquely tailored to the local context.

### Lessons Learnt

The number of unnecessary pre-operative CXRs ordered in SGH is significant despite established, robust clinical guidelines. In light of the barriers cited specific to the local context, this may suggest the importance of highlighting that guidelines are present to eliminate habits of ordering as a precautionary measure and to allay medicolegal concerns. Senior doctors should also set an example by ordering investigations only when medically indicated to inspire behaviour change amongst junior doctors as well. Taking these factors into consideration is pivotal in designing our subsequent implementation plans targeted to SGH.

### Potential Solutions

**Audit** - During this period, 18,096 patients attended PEC, of which 5547 (30.6%) received CXR although it was not indicated. 10,019 CXRs were ordered during this period; thus overutilization of CXRs represents 55.4% of all CXRs ordered. Based on SGH's per-unit cost of CXRs (S\$69), and 12 minutes taken to shoot and read a CXR, this represents S\$382,743 direct costs and 1109.4 man-hours attributed to unnecessary CXRs specific to the elective pre-operative setting.



**Survey** - As it was unclear what were the factors driving high rates of unnecessary pre-operative CXRs, a pre-implementation survey was conducted to elucidate clinicians' awareness and perception surrounding this. 280 doctors responded, of which 75 (26.8%) were senior doctors (Associate Consultant and above). Of the 147 (52.5%) doctors who order pre-operative CXRs at least monthly, 108 (73.5%) agree that some orders are unnecessary.

### Outcomes & Impacts

There were significant differences between junior and senior doctors in the factors influencing their decision to order pre-operative CXRs (Chart 1). Junior doctors felt that instructions from senior physicians and/or the department were more influential than guidelines, whilst senior doctors predominantly looked at local guidelines or instructions from the department in their decision making. Chart 2 reveals a similar difference in the prevalent reasons for ordering more investigations than necessary. Although the top 3 reasons cited were similar in both groups, instructions from department or senior physicians was a particularly strong factor amongst junior doctors.

Chart 1

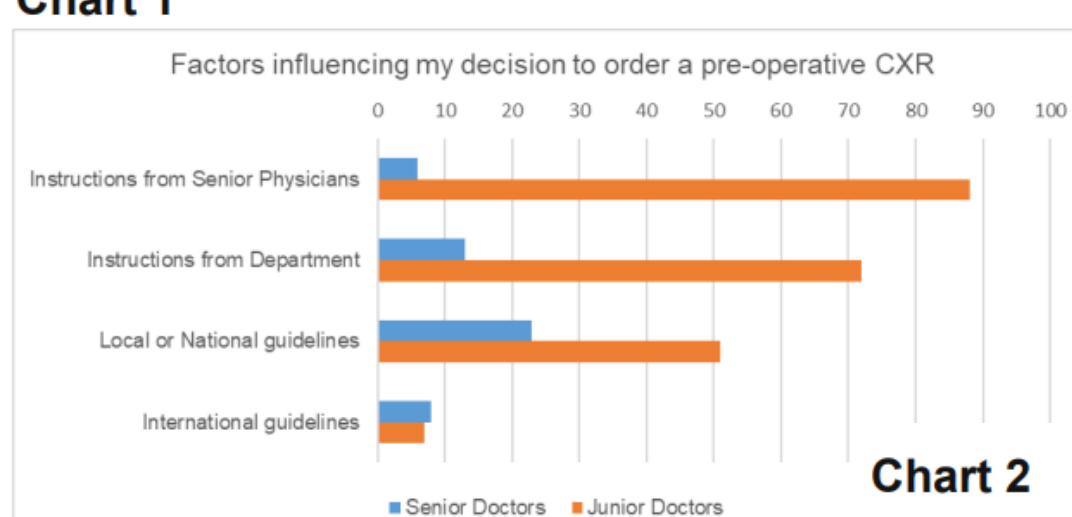


Chart 2

