Staff perceptions of introduction of innovative robotics and software for oncology compounding

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Preliminary results on staff perceptions of approaches to innovative robotics and software for oncology compounding offer an interesting insight into human factors related to technology implementation

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As prescribing of cytostatic agents is growing at a steady pace within healthcare institutions, cytostatic compounding has become a major challenge for European hospital pharmacies. Awareness of operator and patient risks is becoming more acute, and oncology compounding units across Europe are finding it increasingly difficult to recruit and maintain qualified personnel. This situation calls for the development and introduction of new automation approaches.

The EU-funded SafeChemo project targets this challenging scenario, as it offers a series of technological solutions to address oncology compounding problems. The project is coordinated by B Braun Melsungen, and involves leading-edge industry players as well as three pilot healthcare institutions across Europe. Imperial College Healthcare NHS Trust (London, UK), the Capital Region Pharmacy (Copenhagen, Denmark) and the South Tyrol Healthcare Trust (Bolzano, Italy) are engaged in the validation of the SafeChemo service and technological platform, which combines the Cytocare™ robot, the Cytoplan production scheduling software and Oncoplan CPOE.

The SafeChemo pilots are aware of the challenges of implementing automation in healthcare institutions and understand that barriers to the application of potentially useful technologies often lie in their actual performance within healthcare systems and in interaction with human factors. A series of evaluation methods and performance criteria have therefore been developed with the goal of generating valid and reproducible validation data. This project will generate a comprehensive set of outcome measures, grouped under three evaluation domains:

- Safety
- Efficiency.
- Human aspects.

Validation of the three pilots started in the last quarter of 2007, focusing initially on selected outcome measures while the complete platform was being implemented. Special focus has been given to the human aspects evaluation domain, which concentrates on expectations and reactions, as well as on the interaction between operators and technology. This evaluation domain includes outcome measures such as pharmacy staff members' views on the robotics, pharmacy staff members' views on the management software, nursing and medical staff members' views on the prescription software, patients' views, development of new roles for staff, hospital senior managers' views, and quality control staff members' views.

This article presents the results of a pre-installation questionnaire distributed to pharmacy aseptic services staff at the Italian and UK pilot sites. The questionnaire focused on staff expectations regarding the proposed implementation of Cytocare robotics, and involved 14 operators (five in Bolzano and nine in London).

Respondents were asked to answer questions or react to statements mostly by choosing from a five-point Likert scale ranging from "strongly agree" to "strongly disagree". For some questions, direct input on perceived issues or potential gains was required. Considerably more feedback will be gathered throughout the project's lifetime, with the purpose of acquiring a complete overview of staff perceptions at the three pilot sites. Nonetheless, the partial picture obtained via the preliminary results and presented here is quite suggestive of what operators' expectations are regarding the proposed introduction of new technologies.

Views on the current cytostatics management system

Systems currently in use in aseptic units for cytostatic compounding are supported by pharmacy software and CPOE at both sites. Drugs are manually prepared in laminar-flow safety cabinets or in isolators. When asked to rate the overall current cytostatics management system, 100% of Italian and 78% of UK respondents agreed or strongly agreed that it was satisfactory, with 22% of London respondents being indifferent. Despite this high level of overall satisfaction, further questions revealed a number of underlying concerns. There was strong consensus across the two sites that buildup of work at peak times is very stressful (see Figure 1).

Similarly, when asked to comment on the number of steps in the current process and to report on

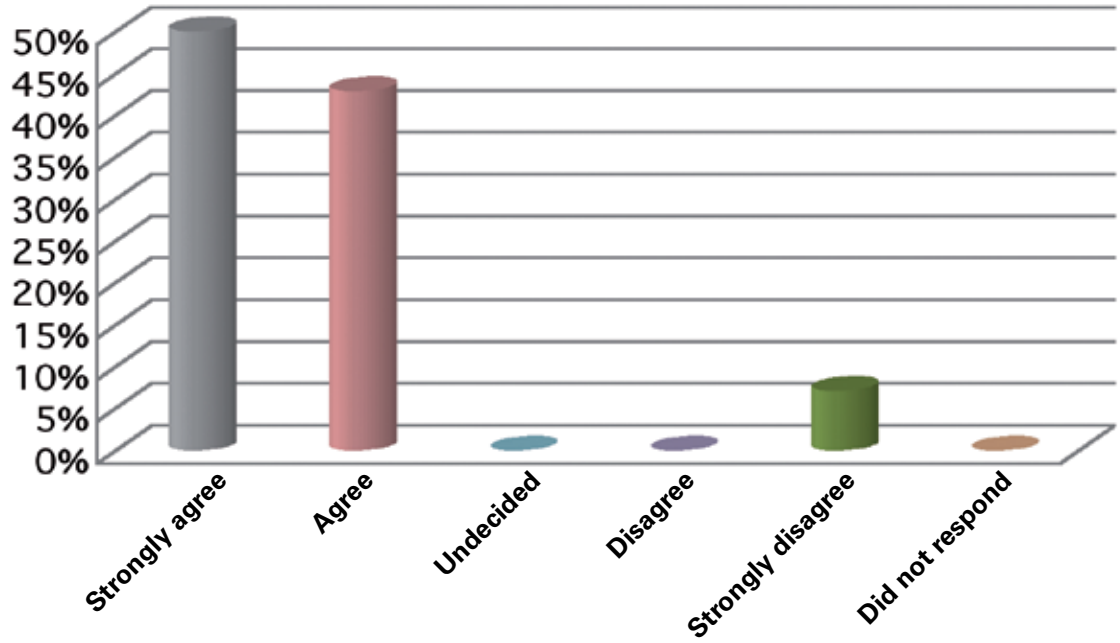

Figure 1. Buildup of work at peak times is stressful

Resource

Further information on the SafeChemo project, including a progress and validation result update
W: www.safechemo.eu

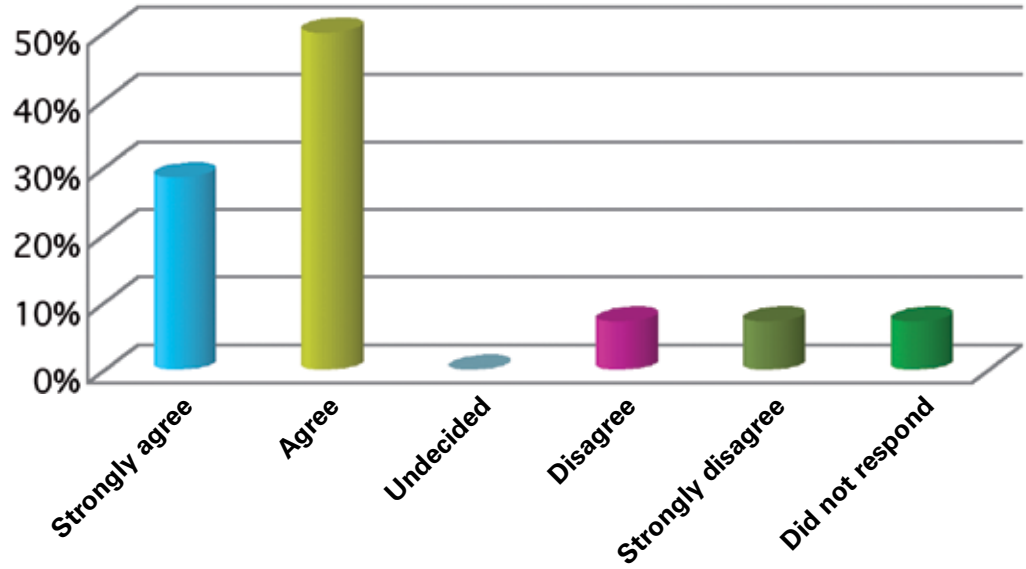

Figure 2. I worry about the risk of exposure to cytotoxic agents in the unit

waiting time for process checks, staff at both sites expressed themselves as less satisfied.

The main concern expressed by staff at both sites was exposure to cytostatic agents (see Figure 2), followed by risk of repetitive strain injuries (see Figure 3).

Expectations of the proposed technology

The investigation into the current systems was followed by a series of questions on respondents' expectations about the SafeChemo technology and the Cytocare robot, which had either just been installed or was about to be installed at the pilot sites.

The most notable expectation of Cytocare robotics is the potential to reduce exposure to cytostatic drugs, although some respondents are not convinced that this will be achieved (see Figure 4). For 22% and 60% of pharmacy staff in London and Bolzano respectively, the introduction of Cytocare within the compounding circuit is also perceived to reduce repetitive strain injuries, and for 50% it will have positive effects on cytotoxic compounding errors.

Finally, only 7% of respondents believe that the

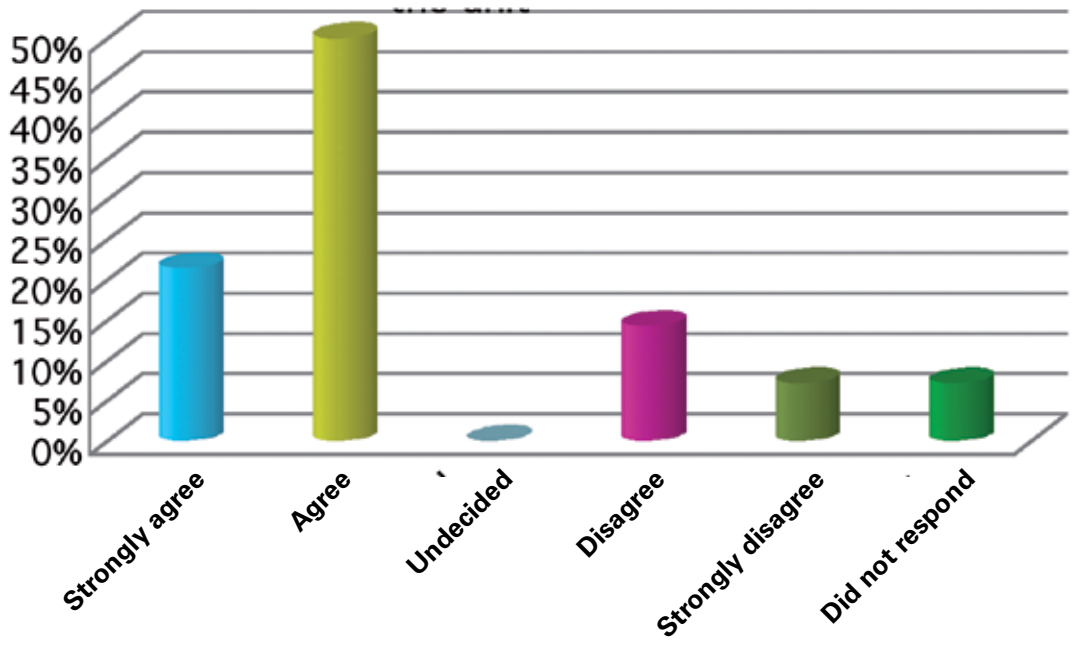

Figure 3. I worry about the risk of repetitive strain injury when working in the unit

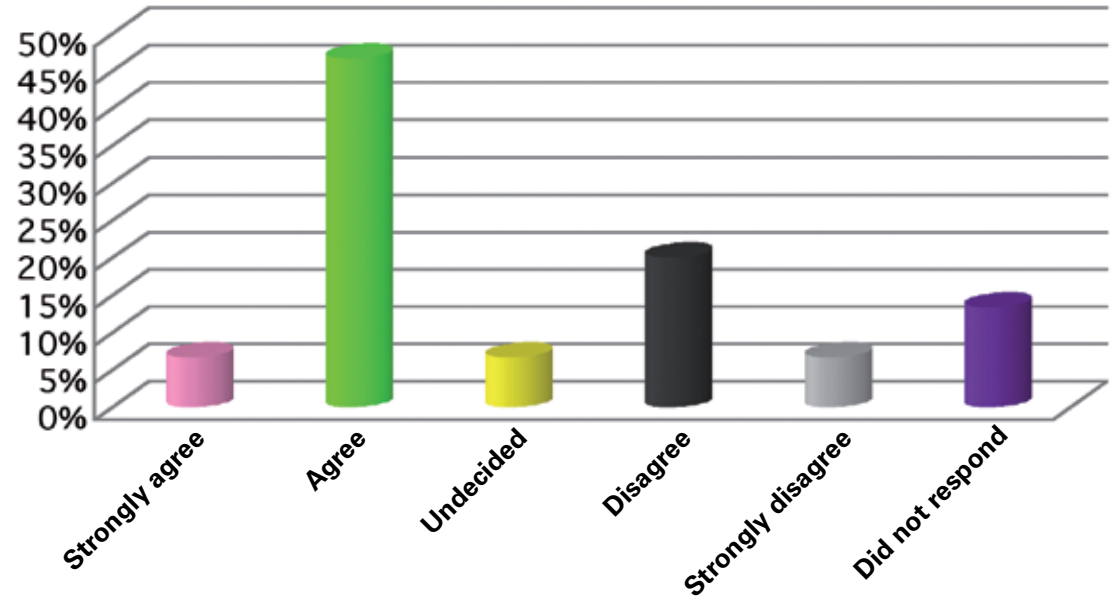

Figure 4. Cytocare will reduce my risk of exposure to cytotoxic agents

introduction of technology will make compounding more difficult in their units and 14% that the technology will increase the time taken to dispense items.

Conclusions

The present preliminary results allow us to draw a few conclusions. Although most respondents state that they are happy with the current system, they are nonetheless aware of risks and constraints. Members of staff at the SafeChemo pilot sites are open to new technologies, and believe technology is likely to have a positive impact on their daily practice, although their expectations are not set too high.

These results will be complemented by further additional pre-implementation interviews and will be compared with post-validation questionnaires. Final results are expected to provide interesting insights into the SafeChemo project specifically, as well as into human factors surrounding implementation of new technologies in general (see Resource). ■