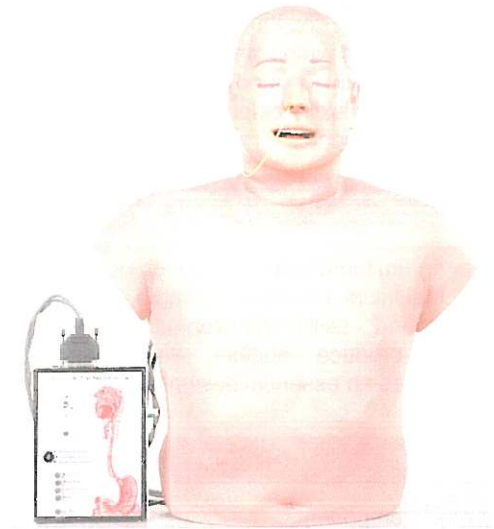




## A Nasogastric Tube Insertion Simulator

Author: Tony Carlisle Supervisors: Prof. Karen Reynolds, Prof. Harry Owen



### Acknowledgements

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Prof. Karen Reynolds Flinders University

Prof. Harry Owen Flinders University

  
National Patient Safety Agency

**Patient safety alert** 05

  
**Alert**  
21 February 2005

**Reducing the harm caused by misplaced nasogastric feeding tubes**  
Nasogastric tube feeding is common practice in all age groups, from neonates to older people. Thousands of feeding tubes are inserted daily without incident. However, there is a small risk that the nasogastric feeding tube can be misplaced into the lungs during insertion, or move out of the stomach at a later stage. Although misplacement can be recognised at an early stage, i.e. before the tube is used, studies have shown that conventional methods used to check the placement of nasogastric feeding tubes can be inaccurate. The NPSA is aware of 11 deaths and one case of serious harm due to misplaced nasogastric feeding tubes over a two-year period.

**Action for the NHS**  
NHS acute trusts, primary care organisations and local health boards in England and Wales should take the following steps immediately:  
1 Provide staff, carers and patients in the community, with information on correct and incorrect testing methods.

Less suffering to mankind is an age old goal.  
This nasogastric intubation simulator now gives  
medical staff the means to successfully  
achieve this goal in a unique and new way.

# A Nasogastric Tube Insertion Simulator

Author: Tony Carlisle Supervisors: Prof. Karen Reynolds, Prof. Harry Owen

School of Computer Science,  
Engineering and Mathematics  
In association with the Clinical  
Skills and Simulation Unit

## PROJECT OBJECTIVE

To design and develop an adult nasogastric tube insertion simulator for medical students and staff to develop suitable skills before attempting nasogastric intubation on patients.

## FEEDBACK

Delivering instantaneous feedback to the trainee during the initial insertion attempts leads to rapid learning and skills development. Having the simulator produce audible, visual and tactile feedback was an essential design element.

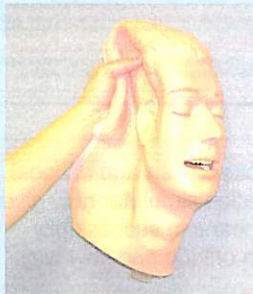
## CONCEPT

Two main components;

1. an upper body manikin that would accept a range of nasogastric tubes.
2. A stand alone electronic control unit.

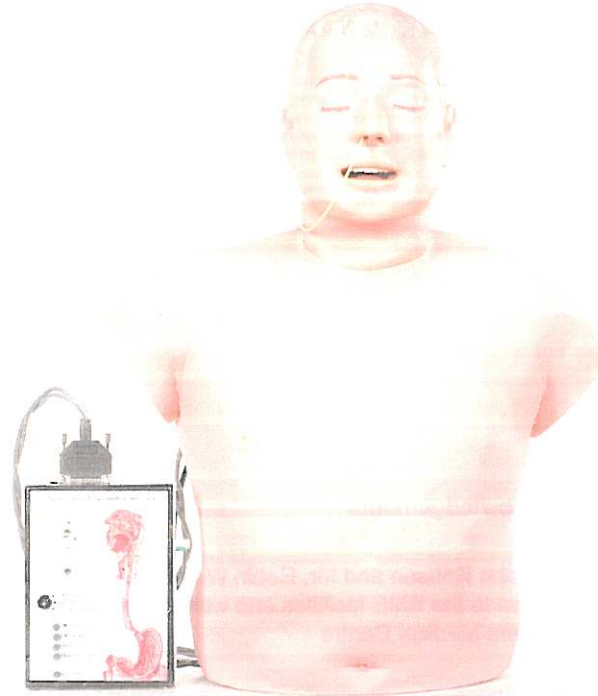
## BENEFITS WITH USING A SIMULATOR

- ✓ No risk to a patient.
- ✓ Controlled environment.
- ✓ Convenient access.
- ✓ Productive feedback.
- ✓ Unusual situations.
- ✓ Competency assessment.

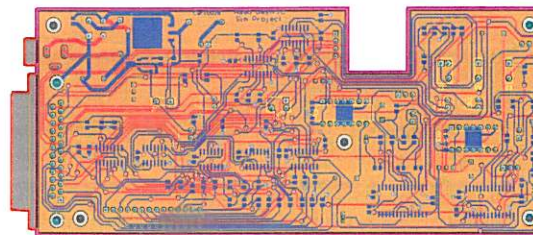


## HEAD

This head was donated at the beginning of the project by the CSSU.



## CONTROL UNIT ELECTRONICS



This is the printed circuit board (PCB) which forms the heart of the control unit. The upper layer is shown in red tracks and the bottom layer shows the blue tracks. Surface mount components were soldered to the bottom layer. A small rechargeable battery mounted inside the control unit powers the system.

## METHOD

The electronics senses the progression through the simulator and lights up a series of green LED's on the control unit front panel when the tube progresses along the correct path into the stomach. ● ● ● ● ●

There are also red LED's that show problematic tube progression. ● ● ● ● ●

## UPPER BODY

An upper body was constructed to integrate with the completed head. Fast setting, non toxic moulding rubber was used to make an upper body mould.



## CONCLUSION

Doctors can now practice on a quality simulator. Patients can rest easy. Less errors, Less harm, Lives saved

