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Evaluation of a New Device for the Transmission of Electrocardiograms by e-mail

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No conflict of interest



Background



- ECG – essential initial test in assessment of variety of conditions
- Confidence and skill in ECG interpretation varies among GPs
- Access to a timely specialist opinion often useful to ensure good quality patient care
- Despite increasing use of electronic patient records most correspondence between GPs and hospital specialists on paper – post or fax
- Electronic transmission of data offers theoretical advantages
- Recent developments in ECG encryption now allow secure digital transmission



Aims



- To establish the practicalities of ECG transmission using the DanMedical system
- To assess the real time delays inherent in using traditional methods of communication compared with transmission via e-mail

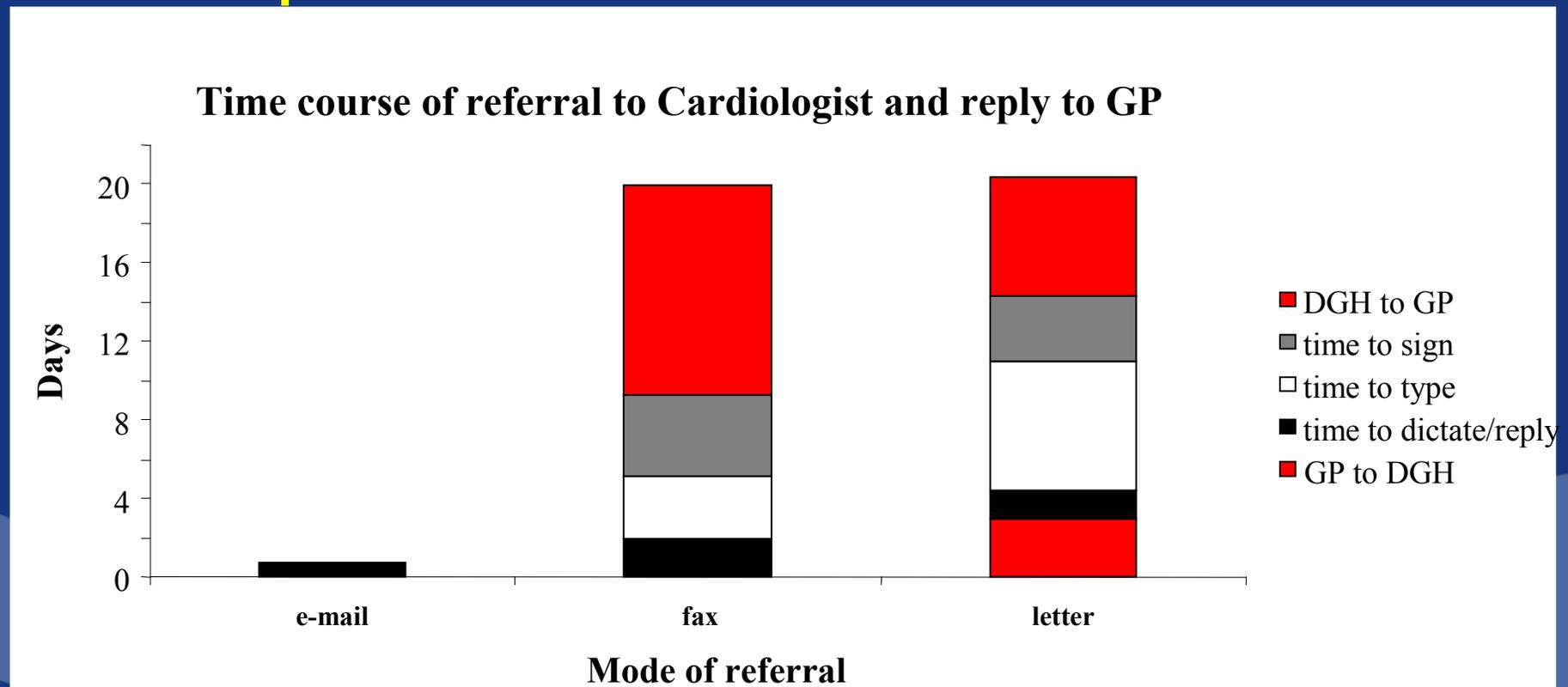


Methods



- Simulated ECG and patient scenarios (n=10) from a remote island GP
- Each referral was simultaneously sent by post, fax or by e-mail by the GP practice nurse to the consultant cardiologist (blinded to ECGs and scenarios)
- Date and time of each stage of the referral and response process recorded for analysis
- Quality of referral ECG/letter recorded by the consultant cardiologist on a visual analogue scale (1-10)
- Length of reply correspondence recorded
- Analysis – student's *t*-test used for comparisons (statistical significance taken at the 5% level)

Time of response



•The average total time for an e-mail response was much shorter (0.7 ± 0.9 day) compared to the faxed referral (19.9 ± 11.5 days, $p < 0.001$) or land-mail (20.4 ± 2.6 days, $p < 0.001$) (Figure)



Results



Data Completeness

- 1 e-mail unanswered, 1 fax and 1 land-mail reply not received by the GP surgery giving a 10% loss of communication in each of the 3 groups. In a further fax referral the ECG was not transmitted

Quality of ECG

- The quality of the faxed ECGs were more variable and of low quality compared with either hard copy by land-mail or by e-mail (6.1 ± 1.2 vs. 10 ± 0 vs. 9 ± 0 , both $p < 0.001$)

Length of response

- e-mail responses were considerably shorter (average 54 ± 8 words) than either fax response (95 ± 32 , $p < 0.01$) or land mail response (87 ± 28 , $p < 0.01$)



Conclusions



- Safe and secure electronic transmission of ECG's using the Dan Medical system is possible
- Electronic transmission reduces significant time delays
- Use of e-mail results in fewer words used in correspondence
- The effect on clinical decision making by changing mode of communication is not known