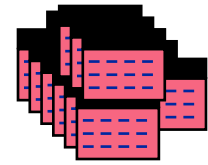


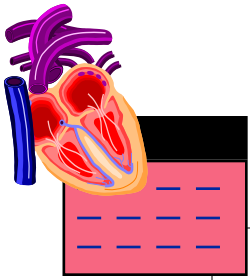
CSRC ECG WAREHOUSE



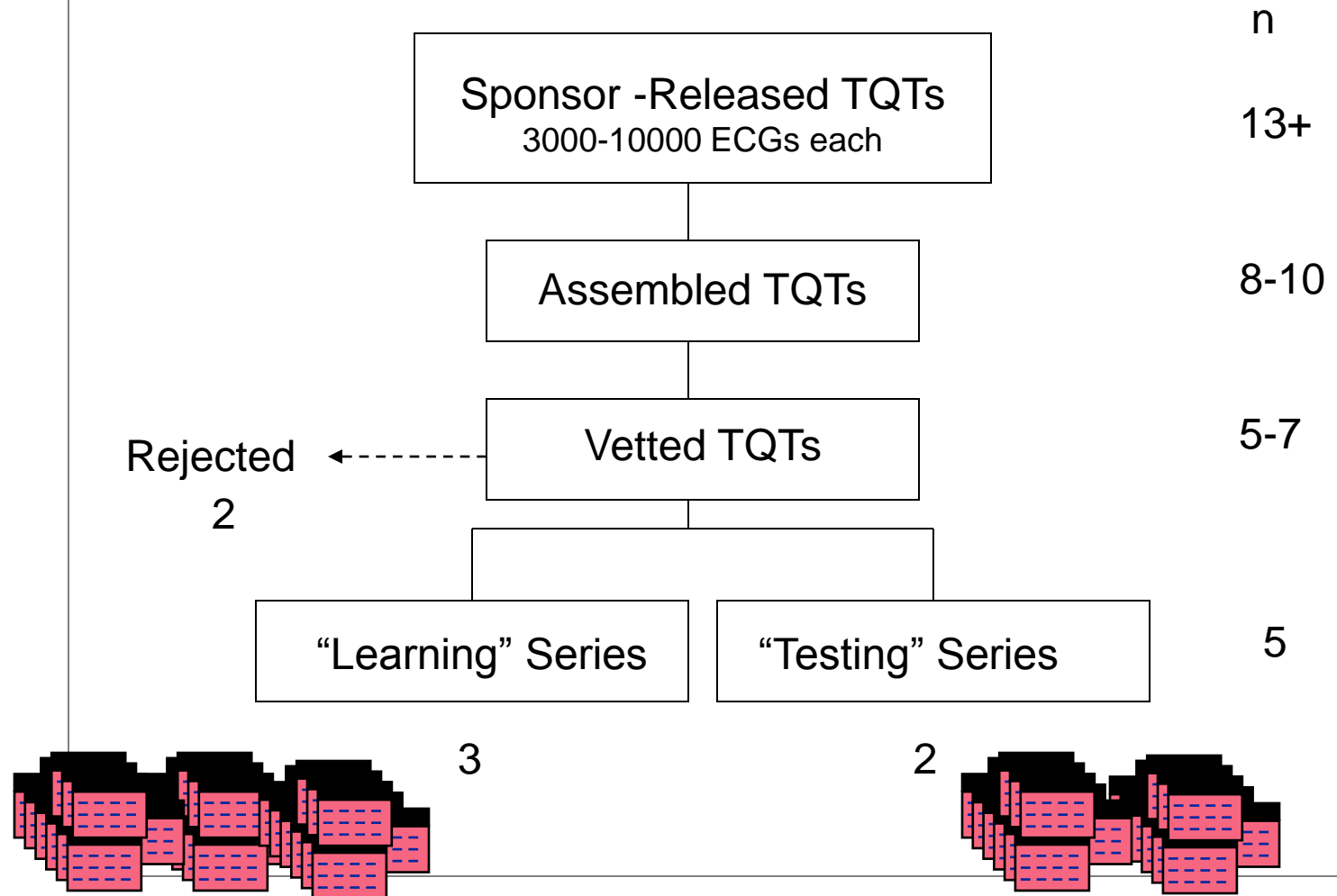
Project Update

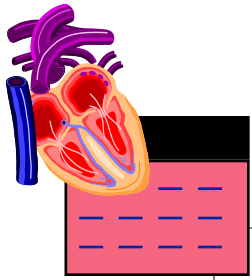
Paul Kligfield, MD
CSRC White Oak
October 5, 2011

Cindy Green, PhD
Norman Stockbridge, MD, PhD
Mike Li, MS
Joanne Zhang, PhD
Justin Mortara, PhD
Pierre Maison-Blanche, MD
Fabio Badilini, PhD

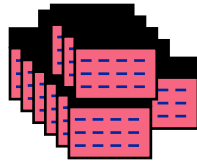


CSRC ALGORITHM DATASETS

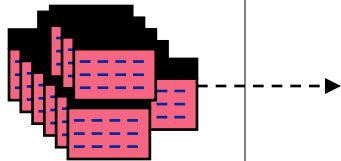




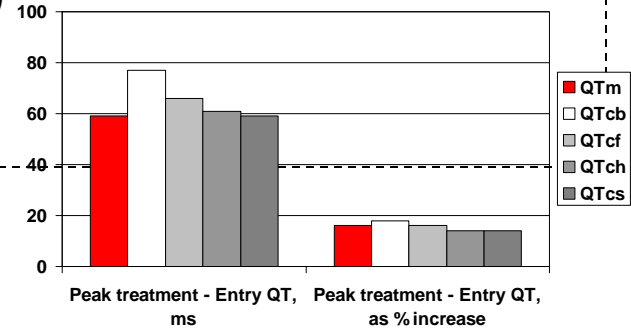
CSRC EXTERNAL DATASETS 12/09/10

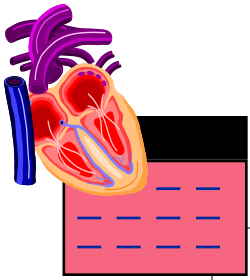


Congenital Long QT Syndrome
400+ Digitized ECGs
All genotyped LQT 1, 2, or 3
(Paris, Pierre Mason-Blanche)
Linked to Holter data in THEW



Arsenic Trioxide in Leukemia
113 Patients, Baseline and Drug
(Cornell)





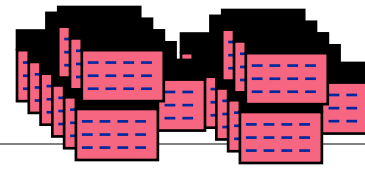
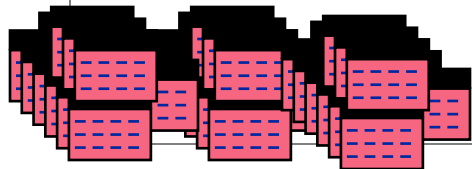
USE OF CSRC ALGORITHM DATASETS

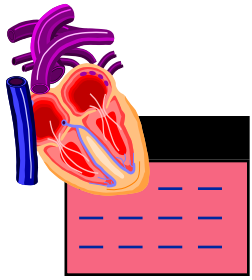
CARDIAC SAFETY

CARDIAC SAFETY

- Algorithm development for TQT
- Blinded testing of moxifloxacin identification
- Population characteristics of ECG
- ECG phenotype and prognosis in LQTS

- Evaluation of QT measurement algorithms used in clinical practice





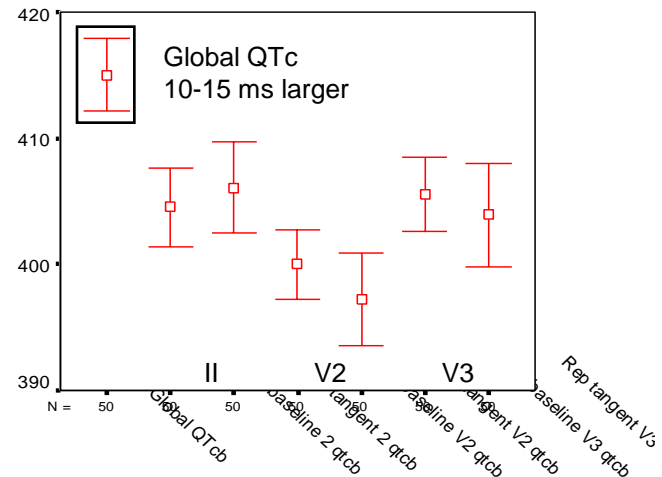
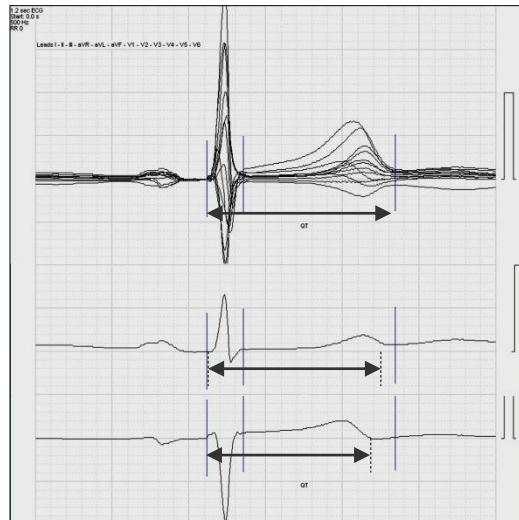
PROGRESS IN AUTOMATED QT MEASUREMENT

- ❑ Computer assisted single lead averaging to produce a “representative complex,” which reduces noise and respiratory variation within individual leads
- ❑ Computer assisted “global complex” formation from simultaneous “representative complexes” to reduce positional effects of single leads and determine earliest onset and latest offset of the “spatial” QT

Superimposed representative complexes

Representative lead II

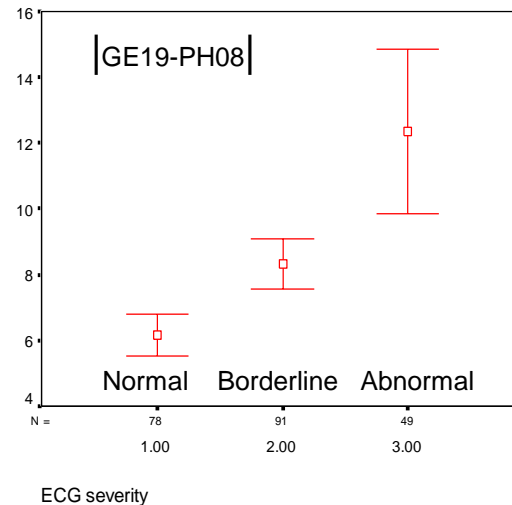
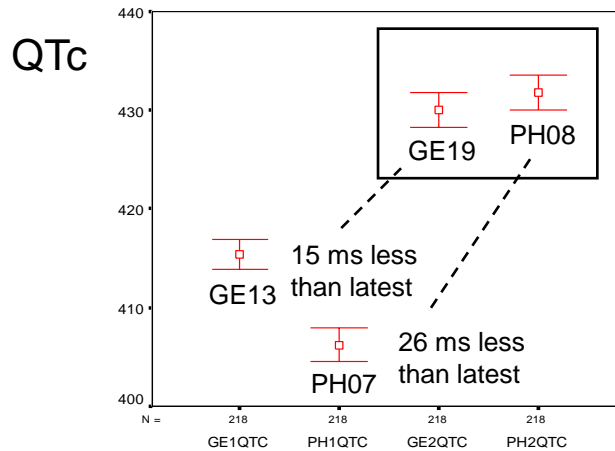
Representative lead V2

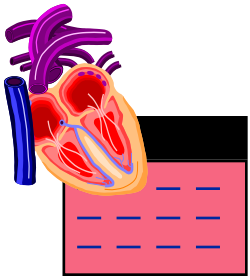




FULLY AUTOMATED QT ANALYSIS IN ROUTINE ELECTROCARDIOGRAPHY

- ❑ Automated global QT interval measurements are increasingly used in clinical practice
- ❑ Problem: *There is no uniformly accepted medical definition of the end of the T wave. (!!)*
- ❑ QT measurements vary with the ECG reader or with the engineering solution of the individual algorithm developer or ECG device manufacturer





CSRC WAREHOUSE ECG INTERVAL CHALLENGE:

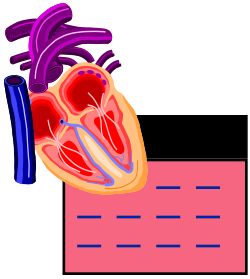
Given

- Increasing clinical acceptance and use of fully automated QT measurements
- Different global QT algorithms used by different manufacturers, and different electrocardiographs used across clinical practice

Questions:

Are there systematic differences in routinely reported QT interval durations among major manufacturers of digital electrocardiographs?

Are differences in QT measurement related to the degree of abnormality of ECG repolarization?



CSRC WAREHOUSE ECG INTERVAL CHALLENGE:

A CSRC facilitated Industry-Academic Partnership

Aim

Without reference to a gold standard, are systematic differences present among the automated QT interval measurements of different manufacturers that might to have clinical significance for population studies and for clinical care?

Dataset and subgroups

- Normal subjects (TQT placebo)
- Moxifloxacin (TQT positive control)
- Congenital LQTS (Paris)

Industry Participants

- ✓ GE Healthcare
- ✓ Philips Medical
- ✓ Mortara Instrument
- ✓ Glasgow (Burdick)