Forecasting

National Immunization
Forecast Tester

Texas Children's
Hospital®

Immunization Forecast Tester

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Background

Texas Children's Hospital (TCH)

- 2009
  Forecaster developed

- 2012
  Forecast testing system online

Massachusetts Immunization Information System (MIIS)

- 2007
  Immunization Forecaster Module (IFM) deployed as independent web-service

Vision for Forecasting

- Accurate – based on latest recommendations

- Consistent – results match other system results

- Ubiquitous – available with every shot history

Current Barriers

- Forecaster Testing

  - Forecasters may not directly support testing

  - Organization may not have the capacity to test

- Non-standard Integration

  - Forecaster integrated directly into IIS or EHR

  - Separate system with proprietary access method

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Proposed Solution

- Centralized location for testing forecasters

- System that can store and organize:
    - Test cases from many different sources
    - Expert opinions on the correct results for test cases
    - Actual results from forecasters

- System that can:
    - Connect to multiple forecast systems
    - Compare expert opinions and actual results

How Solution Will Realize Vision

- Accurate – based on latest recommendations

  - Experts come to consensus on correct results

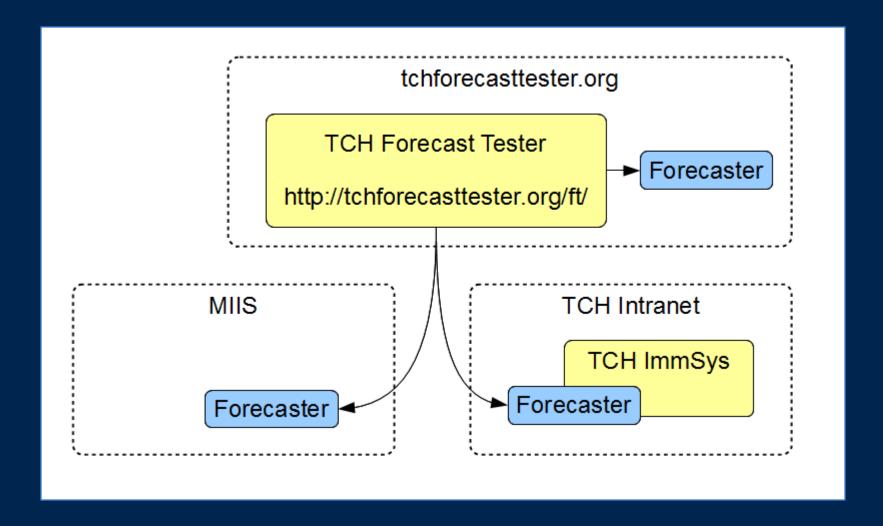 - Real forecasters can be both tested and used as known reference forecasters

- Consistent – results match other system results

  - Results from working forecasters can be compared for differences

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How Solution Will Realize Vision

- Ubiquitous – available with every shot history

  - Integration with national system would encourage the adoption of a national web service standard

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Current System

Current Status

- Number of Test Cases
  - TCH: 880
  - MIIS: 840

- Forecasting for all 840 MIIS messages:
  - TCH with no network penalty: 30 seconds
  - TCH with network penalty: 1 minute 16 seconds
  - MIIS with network penalty: 1 minute 22 seconds

Future Work

- Compare results between TCH and MIIS

- Collect more test cases

- Connect to other forecast engines

- Recruit experts to review and give opinions

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System Demonstration

- Test cases are purposefully designed to over represent edge cases or unusual situations

- The forecast tester is very strict and focuses on exact dates and dose number

- Edge cases contain many issues that have had various interpretations over the last few years

System Demonstration

- This system often finds many differences between two forecasting systems

- It is amazing is how often two different systems do actually agree exactly

System Organization

- **Expert** – a forecast tester user who can give opinions on correct forecast results

- **Task Group** – a set of experts that work together to create sets of tests

- **Test Panel** – a collection of test cases

System Organization

- **Test Case** – a single scenario with expected answers

- **Software** – a forecaster that can evaluate a test case and give an answer

Test Case Information

- Date of Birth, Sex

- Evaluation Date

- Vaccination History
  - CVX
  - MVX (optional)
  - Administration Date

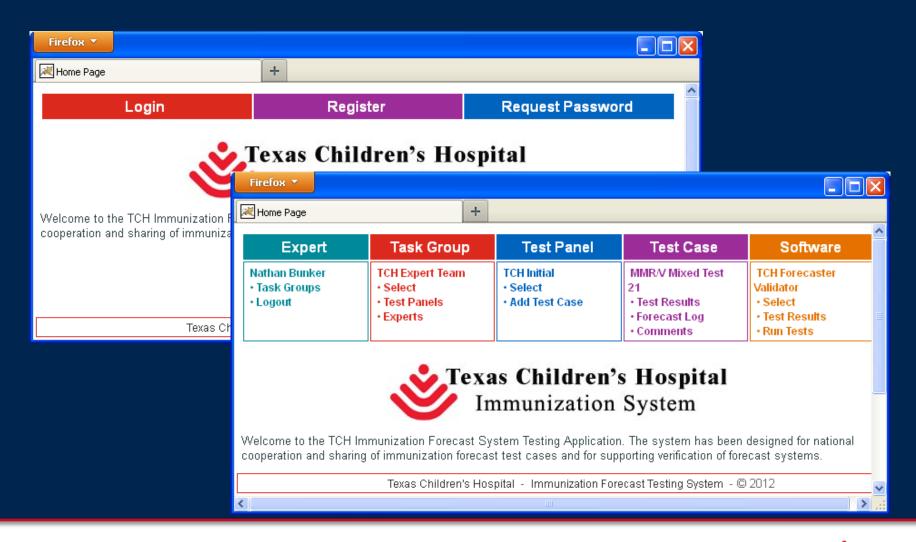Texas Children's Hospital®

Test Case Expectations

- Forecast results:

  - Dose Number

  - Valid Date (earliest date)

  - Due Date

  - Overdue Date

- Evaluation results:

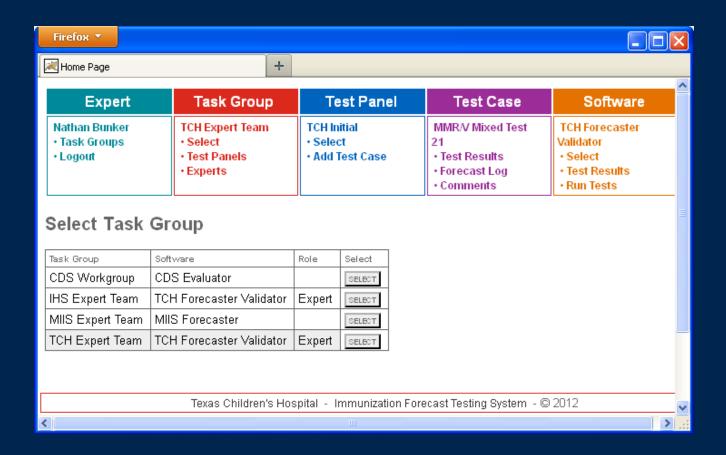 - Not tested directly

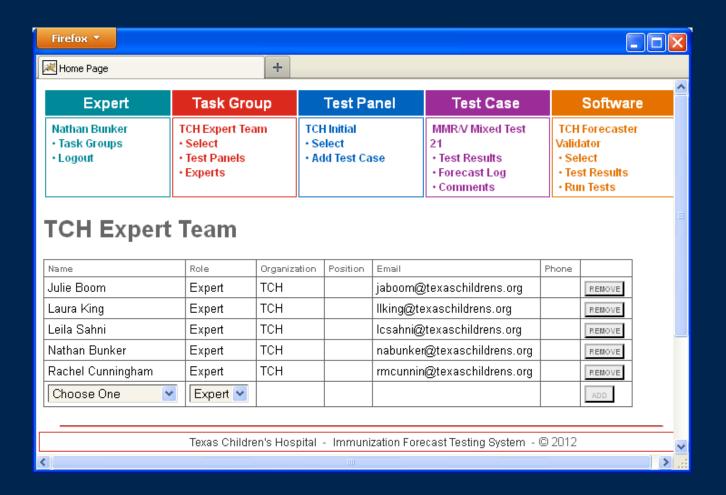 - Future improvement

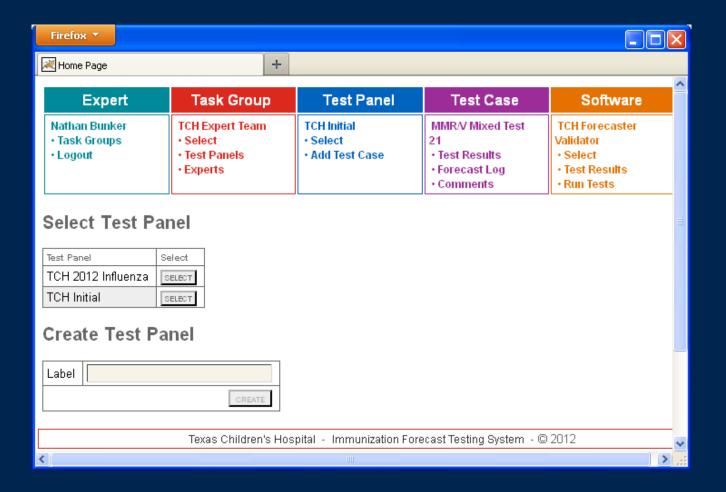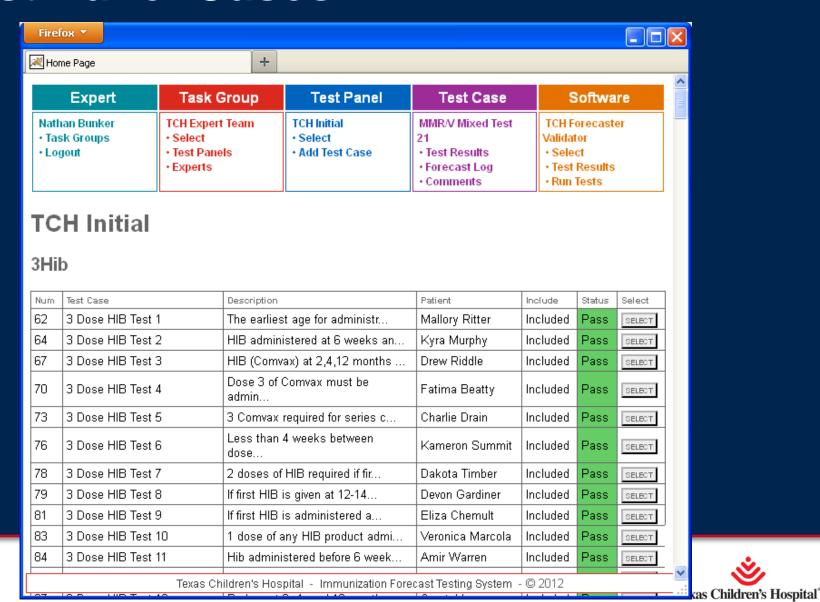Texas Children's Hospital®

Login

Task Groups

Expert Team

Test Panels

Test Panel Cases

Test Case

Test Case Results

Firefox ▾

Home Page

Expert	Task Group	Test Panel	Test Case	Software
Nathan Bunker • Task Groups • Logout	**TCH Expert Team** • Select • Test Panels • Experts	**TCH Initial** • Select • Add Test Case	**3 Dose HIB Test 1** • Test Results • Forecast Log • Comments	**TCH Forecaster Validator** • Select • Test Results • Run Tests

Hib Test Results

Entity	Dose	Valid	Due	Overdue
Expected by TCH Expert Team	1	03/06/2008	03/06/2008	04/01/2008
Actual from TCH Forecaster Validator	1	03/06/2008	03/06/2008	04/01/2008
Actual from MIIS Forecaster	1	02/12/2008	03/01/2008	04/01/2008
Actual from TCH Nathan Dev Web1	1	03/06/2008	03/06/2008	04/01/2008
Actual from TCH ImmSys Prod	1	03/06/2008	03/06/2008	04/01/2008
Actual from TCH ImmSys Test	1	03/06/2008	03/06/2008	04/01/2008

Set Expected Values for Task Group

Dose   1

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× Find: mmr/v   ↓ Next   ↑ Previous   Highlight all   ☐ Match case

Test Case Comments

Select Software

Browser window titled "Home Page" showing the Immunization Forecast Testing System.

Navigation columns:

Expert	Task Group	Test Panel	Test Case	Software
Nathan Bunker • Task Groups • Logout	TCH Expert Team • Select • Test Panels • Experts	TCH Initial • Select • Add Test Case	MMR/V Mixed Test 21 • Test Results • Forecast Log • Comments	TCH Forecaster Validator • Select • Test Results • Run Tests

Select Software

Software	URL	Schedule	Select
CDS Evaluator			SELECT
MIIS Forecaster	http://69.64.70.10:8080/vfmservice/VFMWebService		SELECT
TCH Forecaster Validator	http://tchforecasttester.org/fv/forecast		SELECT
TCH ImmSys Prod	http://207.231.32.185:8081/web1/doForecastText.do		SELECT
TCH ImmSys Test	http://207.231.32.186:8081/web1/doForecastText.do		SELECT
TCH Nathan Dev FV	http://192.168.1.7:8221/fv/forecast		SELECT
TCH Nathan Dev Web1	http://192.168.1.7:8221/web1/doForecastText.do		SELECT

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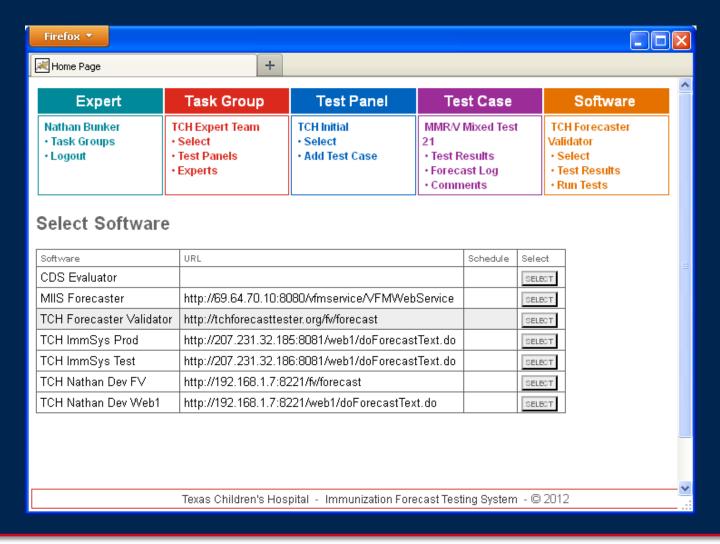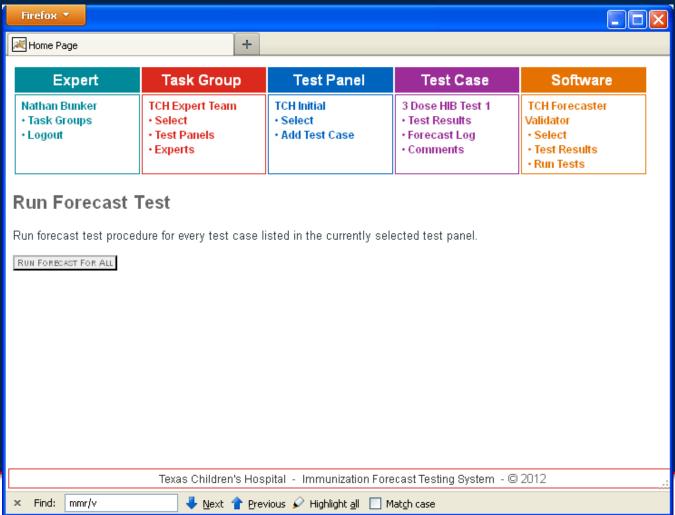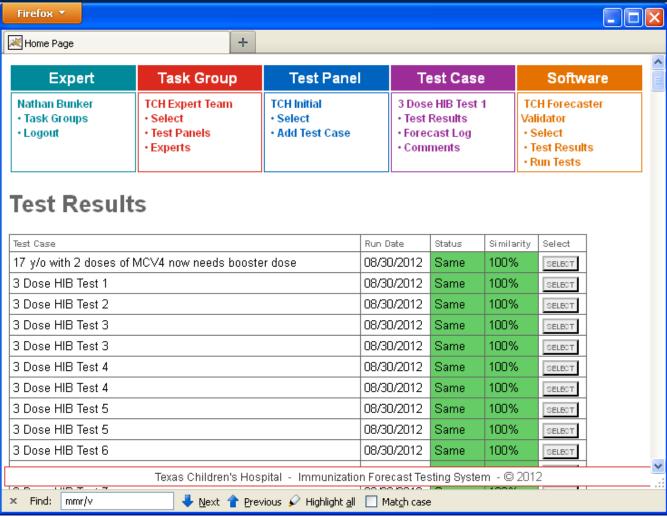
Run Tests

Test Results

Become Involved!

- Register at http://tchforecasttester.org/ft/

- Contact technical team to:
  - Bulk upload test cases
  - Connect your forecaster

- Contact Information
  - Nathan Bunker – nabunker@texaschildrens.org
  - Bill Adams – badams@bu.edu

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