

Walter Reed National Military Medical Center
9th Annual National Capital Region Research Competitions
BAILEY K. ASHFORD AWARD ■ APPLICATION GUIDE

Introduction

History

The Bailey K. Ashford Clinical Research Award was established through the efforts of Colonel Marcel E. Conrad, the first Chief of Clinical Investigation at the Walter Reed Army Medical Center in Washington, DC. At his retirement in 1974, Dr. Conrad dedicated the award to Colonel Bailey K. Ashford, honoring Dr. Ashford's work during the early 1900s solving the problem of hookworm-induced anemia in Puerto Rico. The Department of Clinical Investigations added the laboratory component to the Ashford Research Awards in 1996.

That year, the Graduate Medical Education (GME) programs of the Army, Navy, and Air Force in the National Capitol Region joined forces. Any trainee who belonged to a program for which Walter Reed Army Medical Center was a teaching center became eligible to compete for the awards. Since the 2011 Base Realignment and Closure, which joined institutions in the National Capital Region Medical Directorate, the Ashford awards have been presented annually to graduating trainees who have contributed the most significant research to a clinical or laboratory program during training in a GME program.

Eligibility Requirements

- All military physicians and dentists who are full-time trainees in a GME program in the National Capital Region are eligible.
- Applicants must complete the training program during the academic year of the award.
- Applicants must not have previously received a prior Ashford award.
- Applicants must be *nominated by their program directors*.

Deadline

Abstract submission period: **01–30 January 2017**. Please submit the entire abstract submission package to the Department of Research Programs by the end of **30 January 2017**.

Send it all to dha.bethesda.wrnmcc.mbx.researchandinnovationmonth@mail.mil. You will receive an email confirming receipt of your package and a message if any of your material is missing.

Please complete and submit these six documents to qualify your nominee for a review:

1. Nomination Form (page 3)
2. Abstract Submission form (page 4)
3. Abstract (page 5)
4. Submission Questionnaire, to be filled out by the nominee (page 6)
5. One-page summary of the nominee's overall achievements during the training period
6. Nominee's curriculum vitae (CV)

Poster Display Week

All nominees must display their research posters at Poster Display Week. Look for e-blasts with details. The Medical Graphic Arts Department can create research posters for free. Please submit a work order form and the draft poster to MGAD by **27 February 2017**.

Research Symposia I and II

Competition category finalists notified in March–April will give a slide presentation of their submission at Research Symposia I or II. Slide presentations will be 15 minutes, followed by a 5-minute question-and-answer session. Awards will be given at the conclusion of Research Symposium II.

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You may also find all research competition forms and documents on the Department of Research Programs (DRP) internet (public) and intranet (SharePoint) sites. Please follow the instructions below:

1. DRP Public Site (<https://www.wrnmcc.capmed.mil/ResearchEducation/ResearchPrograms/SitePages/Home.aspx>): On the left column, click Research & Innovation Month under Services, and scroll down to *All Important Documents*.
2. DRP SharePoint Site (<https://www.wrnmcc.intranet.capmed.mil/EducationTrainingResearch/ResearchProgramsDepartment/SitePages/Home.aspx>): On the left column, click 2017 Research and Innovation Month under Research Education Services, and locate the *9th Annual Research Competitions* folder.

Task Checklist

- Applicant starts *research project* during training period.
- Applicant and nominator complete required paperwork for the award in December–January.
- First Submission**
Deadline: No later than **30 January 2017**. Applicant submits abstract submission material to dha.bethesda.wrnmcc.mbx.researchandinnovationmonth@mail.mil. Please use this subject line format: Last Name, First Name (Category-Training Status-Category Type). *Example: White, Ben (BKA-Fellow/Staff-Clinical)*
- Include these six documents:
 1. Nomination Form (page 3)
 2. Abstract Submission Form (page 4)
 3. Abstract (page 5)
 4. Applicant's Submission Questionnaire (page 6)
 5. One-page summary of the nominee's overall achievements during the training period
 6. Nominee's curriculum vitae
- Messages will go to applicants on the status of their abstract submission package. If the submission package is incomplete, the applicant may submit the missing material, with the same subject line, **before 06 February 2017** to dha.bethesda.wrnmcc.mbx.researchandinnovationmonth@mail.mil.
- Second Submission:**
Deadline: **27 February 2017**. Submit a poster draft, Medical Graphic Arts Department (MGAD) work order form, BUMED Instructions for Permission form and a HIPAA Privacy Release form to MGAD for its production. MGAD points of contact are Mary-Ann Ayrandjian (mary-ann.ayrandjian.civ@mail.mil) and Shane Stiefel (shane.m.stiefel.civ@mail.mil). **Note: Please provide permissions for images and brands, and any copyright information, for your poster.**
- Receive email notification of whether applicant is a finalist for the Ashford award category (**March–April 2017**). Finalists start preparing a slide presentation for Research Symposia I and II.
- Finalists pick up poster from MGAD upon email announcement.
- Finalists create and submit slide presentations, based on the research abstract, for Research Symposia I and II.
Deadline: **24 April 2017**.
- Finalists display research poster at Poster Display Week (**01-05 May 2017**).
- Finalists prepare formal uniform to present at Research Symposia I or II, as assigned (**09 or 10 May 2017**).
 - o Army: Class A Uniforms
 - o Navy: Dress Blue Uniforms
 - o Air Force: Service Dress
 - o Federal employees and contractors: formal business attire
- Finalists attend the awards ceremony at Research Symposium II (**10 May 2017**).

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Nomination Form

FROM: Program Director _____
Name, Rank and Title _____
Name of Program _____

TO: Chief, Department of Research Programs (Walter Reed Bethesda)
SUBJECT: Nomination for the 9th Annual National Capital Region Research Competition
DATE: _____

I request that the following nominee be considered for the Bailey K. Ashford Award for 2017 graduating trainees of the Medical Corps in this category (please choose one):

Clinical *or* *Laboratory*

Nominee Information:

Name, Title: _____
Company (USAE: Alpha Co, Bravo Co, or HHQ Co) or Navy/AF: _____
Project IRB number (if applicable): _____
Project time period: _____
Duty assignment: _____
Year of training: _____
Email addresses:
 Primary (Military Issued Email Address) _____
 Secondary _____
Phone numbers:
 Daytime and Evening: _____
 Pager Number/Cell: _____

Please attach these six documents to the submission email, to ensure review of the application:

- Nominee's curriculum vitae
- The research project abstract
- Abstract submission form (see below)
- Ashford submission questionnaire (to be filled out by the nominee)
- Ashford nomination form
- A one-page summary of the trainee's overall achievements during the training period (by nominator)

Signature, department head (program director)

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Abstract Submission Form

Project Title _____

Author(s)

Name, Title, Department

Bailey K Ashford Award for Medical Corps 2017 graduating trainees (please choose one):

Clinical *or* *Laboratory*

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Abstract

Abstract (One-page, Times New Roman, 12-point font):

Objectives:

Methods:

Results:

Conclusions:

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Bailey K. Ashford Submission Questionnaire
(to be filled out by the nominee)

- Contributions of each author and author's institution listed on the abstract

- During which training years did you work on this project?

- List any published but not presented abstracts resulting from this project.

- List any posters and poster presentations resulting from this research.

- List any oral presentations resulting from this project.

- List any peer-reviewed publications resulting from the research.

- List other research projects, related or unrelated to the competition submission, which you did during training.

- List any case reports, related or unrelated to this research, which you submitted during training.

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Laboratory Abstract Submission Example

Here is an abstract submitted by a recent laboratory winner of the Bailey K. Ashford Award.

OBJECTIVES: Heterotopic ossification (HO), the ectopic formation of mature lamellar bone in nonosseous tissue, occurs following traumatic combat injuries, including traumatic amputations, in nearly two-thirds of patients. Up to 40% of patients with HO require surgical resection. Though means of primary prophylaxis exist, they are contraindicated, impractical and/or unproven in the combat casualty care setting. As such, a considerable amount of effort has been directed towards developing novel means of primary prophylaxis and treatment. However, there is currently no existing animal model for combat-related HO that recapitulates the systemic and local inflammatory response observed in combat trauma. We sought to (1) reproduce the phenotype of combat-related HO in a rat, by emulating patterns of injury seen in patients with severe extremity injuries resulting from explosive blasts, to create a preclinical small animal model of combat related HO in order to address mechanistic questions that are difficult to address with clinical studies and evaluate novel therapeutic approaches and (2) determine if the presence of bioburden (*Acinetobacter baumannii* (AB) and methicillin-resistant *Staphylococcus aureus* (MRSA)) impacts the magnitude of HO formation.

METHODS: Adult male Sprague Dawley rats underwent a combination of one or more insults to recreate the following: (1) systemic inflammation induced by blast overpressure (BOP), (2) extremity trauma by creating an open femur fracture with a soft tissue crush injury, and (3) amputation (AMP) or fracture fixation (FX). The BOP was delivered at 120 +/- 7 kPa, the open femur fracture was created from a 500g drop weight apparatus, and the crush injury from compression clamps at 20psi for 1 minute over the fracture site. After the injury, the rats underwent transfemoral amputation or fracture fixation using a kirschner wire. The presence of HO was evaluated using radiographs, micro-CT and histology. Once the model was established, we used the above model and inoculated the wounds beneath the myodesis with MRSA or AB.

RESULTS: Seventy-four rats were randomized into five groups: 10 BOP-CTL, 10 FX-CTL, 10 AMP-CTL, 23 BOP-FX, and 21 BOP-AMP. Twelve rats were euthanized early and the 62 remaining rats were included for statistical analysis. The first radiographic signs of HO occurred between two and four weeks post-operatively. HO did not develop in the BOP-CTL nor the FX-CTL groups. HO developed in 7 of 16 BOP-FX, 6 of 9 AMP-CTL, and in all 20 BOP-AMP animals. The addition of BOP resulted in significantly higher prevalence of HO, when comparing the AMP-CTL and BOP-AMP groups ($p=0.007$). Histologic analysis demonstrated evidence of chondrocyte hypertrophy, cartilage vascularization and early mineralization of the cartilage noted in BOP-AMP injured animals by 14 days post injury, whereas histopathologic assessment at 24-weeks post-injury revealed minimal periosteal new bone formation in BOP-CTL animals. In experiment two, 48 additional rats underwent BOP-AMP then either remained a control ($n=8$) or were inoculated with MRSA ($n=20$) or AB ($n=20$). At 12 weeks, we observed more severe HO in rats infected with MRSA compared to AB ($p<0.001$) and control ($p<0.001$).

CONCLUSIONS: We successfully developed a model for blast-related HO in a rat by recreating a relevant combat-injury pattern using a series of precise, reproducible interventions. Blast over pressure in the presence of extremity trauma as described produced radiographically evident HO in the majority of rats. The BOP-AMP group demonstrated HO in all surviving animals with acceptable mortality, and HO severity increased with the addition of MRSA, but not AB. Future studies may use the BOP-AMP-MRSA model to investigate early cellular and molecular pathways, test the effects of various intensities of BOP, and evaluate novel means of primary prophylaxis and treatment currently in development.

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Clinical Abstract Submission Example

Here is an abstract from a recent clinical winner of the Bailey K. Ashford Award:

ABSTRACT (One-page, Times New Roman, 12-point font)

Title:

Feasibility of Intercostal Artery Doppler Ultrasound Exam Prior to Thoracentesis

Objective

Thoracentesis is performed at least 200,000 times annually in the United States. Hemorrhagic complications occur in up to 2% of thoracenteses; many result from intercostal artery injury. A growing body of cadaver and radiographic research indicates the traditional landmarks-based approach to avoiding intercostal arteries is dangerously inadequate. Tortuous or accessory intercostal arteries may course far from the protection of the accompanying rib. Small series and anecdotal experience indicate the intercostal arteries can be visualized with ultrasound. We undertook this prospective pilot study to determine the feasibility of routinely performing a Doppler arterial exam prior to thoracentesis.

Methods

20 adult patients with pleural effusions requiring thoracentesis were enrolled in this prospective observational study. Physicians performing thoracentesis identified and marked a planned needle entry site using phased-array ultrasound. Investigators examined the ipsilateral hemithorax with a high-frequency linear ultrasound probe using color Doppler to identify the intercostal arteries. Distance between artery and rib at the marked site was noted. Time to complete routine and arterial ultrasound examinations and the procedure in total were recorded. Physicians and patients were surveyed to determine the perceived burden of the additional exam and effects on perceived safety.

Results

The intercostal arteries were identified in 14 of 20 patients (70%) and 13 of 14 nonobese patients (93%). The artery was noted directly in the proposed needle path once (5%) and was near the proposed site once (5%). The mean time to perform the study exam was 1:59 minutes (SD 1:07), while routine exam took 4:18 minutes (SD 2:29). The procedure in total took 25:12 minutes (SD 7:22). Physicians noted minimal perceived burden, scoring 4.75 (SD 0.55) on an anchored Likert-like scale from 1 (significant burden) to 5 (no burden). An increase in the perceived safety of the procedure was noted both among physicians ($p < 0.001$) and patients ($p = 0.012$).

Conclusions

The intercostal arteries can be identified with color Doppler ultrasound in most patients undergoing thoracentesis. The time and perceived burden associated with the additional exam is minimal; it is feasible for research and routine practice. The exam increases perceptions of safety and in some instances may avert arterial injury. Further prospective study powered to detect a difference in outcomes is required to demonstrate an actual effect on safety.

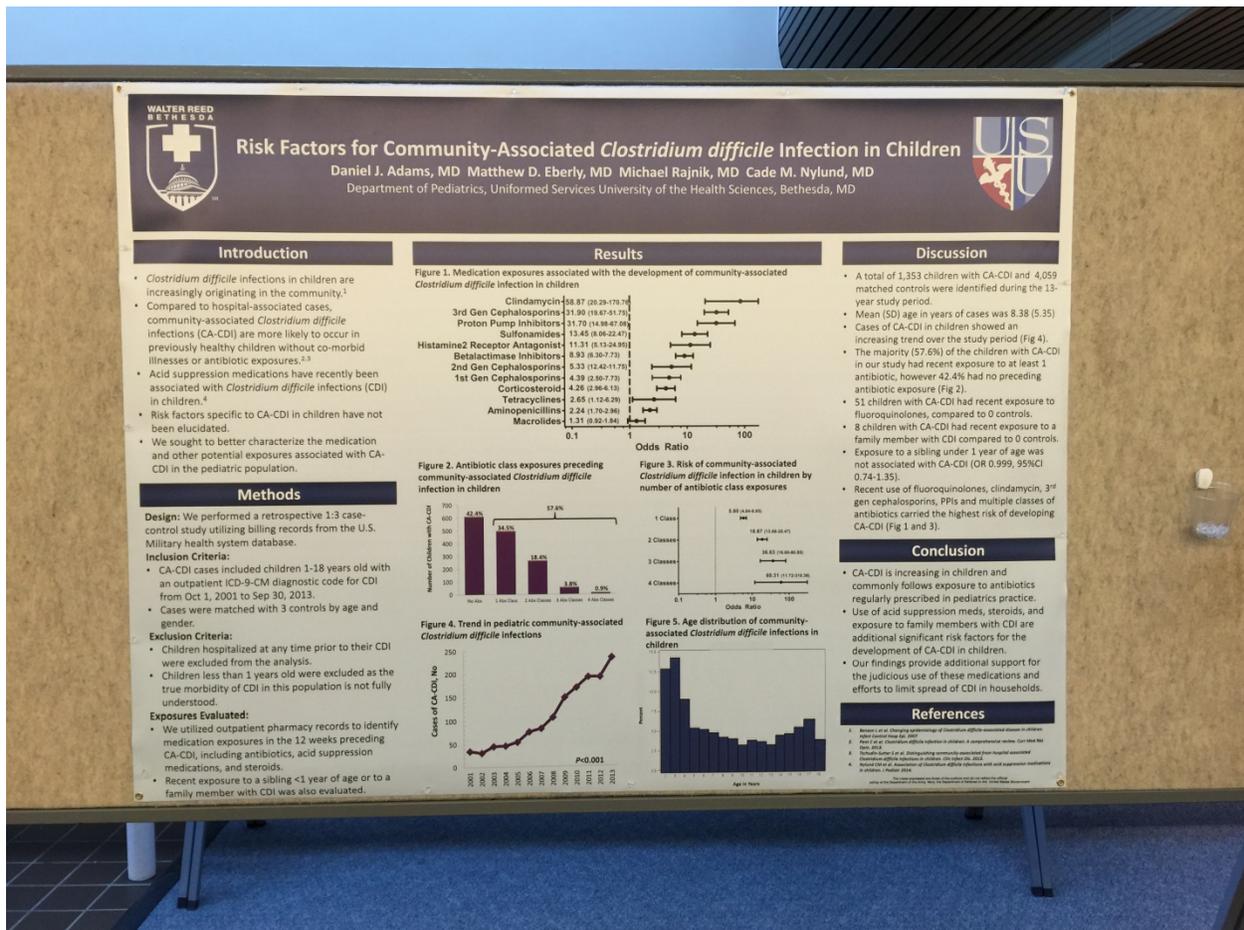
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Poster Guide

Bailey K. Ashford Award applicants are free to choose the content and arrangement of their posters. However, research posters should all have the following items:

1. Title
2. Introduction and/or Objectives
3. Methods
4. Data/Results
5. Discussion
6. Conclusion
7. References

The picture here is an example of a poster from 2015 Poster Display Week.



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Slide Presentation

Build your slide presentation with the same elements, in the same order, as your research poster. However, you may choose the content and how to show it. Make text large enough for the audience to read (± 20 points, for most fonts).

Here is a sample slide presentation from one of the 2016 winners of the Bailey K. Ashford Award.

Distal Ulnar Hounsfield Units Accurately Predict Bone Mineral Density and Future Fragility Fracture Risk

Scott Wagner, MD
Theodora Dworak, MD
Patrick Grimm, MD
Christian Balazs, MD
Scott Tintle, MD

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Osteoporosis

- Low bone mineral density
- Predisposition to "fragility" fractures
 - Spine
 - Hip
 - Wrist
- Classically worked up and diagnosed with DXA
 - Estimates BMD for the forearm, femoral neck, hip and lumbar spine
 - Management includes Ca/vit D, weightbearing exercises, bisphosphonates

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Bone health

- Low rates of screening
 - Surgeon discomfort with management
 - Bridging the gap
- "Own the bone"
 - Push from AGA
 - Consider bone health vice only fractures and classic orthopaedic diagnoses



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Osteoporosis screening



- Compared Hounsfield units (HU) of patients with distal radius fractures (DRF) to matched controls
- Lower average HU found in DRF group
- No DXA data, no follow up data

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Hounsfield Units

- A linear transformation of the original linear attenuation coefficient measurement
 - The radiodensity of distilled water at standard pressure and temperature is defined as zero HU
- A change of one (HU) represents a change of 0.1% of the attenuation coefficient of water

$$= 1000 \frac{(\mu - \mu_w)}{\mu_w}$$

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Purpose

- Threefold:
 - To assess the relationship between distal ulnar HU measurements and forearm bone mineral density as determined by dual X-ray absorptiometry
 - Relationship of these HU to central BMD
 - Utility of HU in predicting future fragility fractures

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Methods – Bone Mineral Density

- Retrospectively reviewed records of all patients with both CT and DXA
 - 1/3 forearm T-score and BMD
- HU measurements performed at distal ulnar head
 - Author blinded to DXA results

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Methods – Bone Mineral Density



- Circular region of interest created with IMPAX software
- Localized to cancellous region of distal ulna at level of DRUJ
 - Most reproducible, rarely fractured
- Three sequential measurements

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Methods – Fragility Fractures

- IMPAX queried for all wrist CTs in system
- Measured distal ulnar HU values
 - Blinded
 - Minimum 95% confidence interval calculated
- Retrospectively reviewed records for fragility fractures
 - Hip, spine, rib fractures included

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Results – Peripheral BMD

- 77 total CTs in 74 patients with DXA data for the forearm
- 76% female, average age 57.4 years
 - N = 5 osteoporosis of FA (T-score < -2.5)
 - N = 28 osteopenia of FA (T-score between -2.5 and -1.0)
 - N = 44 normal BMD

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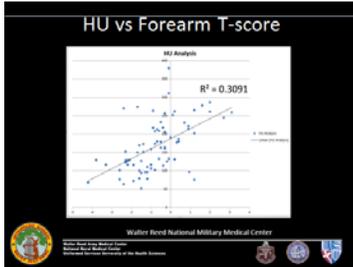
Results – Peripheral BMD

- Average distal ulnar HU values:
 - 98HU for osteoporosis
 - 126HU for osteopenia
 - 198HU for WNL
 - Combined "low BMD" group: 123 HU
- Comparing groups:
 - Osteoporosis/osteopenia vs WNL: 98.1 and 126.9HU vs 198.6HU, respectively (p<0.0001)
 - Combined low BMD group vs WNL: 122.5HU vs 198.6HU (p<0.0001)

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"Distal Ulnar Hounsfield Units Accurately Predict Bone Mineral Density and Future Fragility Fracture Risk"
by Scott Wagner, M.D., et al. (second and final set of slides)



Results - Screening

- Of 77 CTs:
 - Calculated 95% confidence intervals for each group and patient
 - Maximum 95% CI for osteopenic group - 146HU**
 - 64.9% of all scans had minimum HU values consistent with low BMD
- Average forearm T-score for patients below 146HU vs those above: 1.33 vs +0.2, ($p < 0.0001$)
- Sensitivity and negative predictive value for low BMD: 91% and 89%
- Specificity for osteoporosis with HU below 100: 84%

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Results - Central BMD

- Eighty-eight CT scans in 85 patients
 - 78% female
 - Average age 57.4 years
 - N = 8 with osteoporosis of femoral neck
 - N = 47 with osteopenia
 - N = 30 normal BMD
- HU values:
 - Osteoporosis vs osteopenia: 109.6 HU vs 150.5 ($p < 0.0001$)
 - Osteoporosis vs WNL: 109.6 vs 188.0 ($p = 0.006$)
 - Combined low BMD vs WNL: 144.9 vs 188.0 ($p = 0.007$)

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Results - Fragility fractures

- 161 CTs in 159 patients
- 34 fragility fractures (FF) in 25 patients
 - Overall prevalence of 15.7%
- Patients with FF were older (60 vs 55 years) and a higher percentage were female (73% vs 50%)

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Results - Fragility fractures

- Average HU in the fragility fracture group was significantly lower (126.2 vs 200.5HU, $p < 0.0001$)
- 49% of all patients stratified as low BMD (below cutoff of 146HU)
- Percentage of patients below cutoff with FF was significantly higher (29.5% vs 2.5%, $p < 0.0001$)
- Odds ratio (OR) for fragility fracture in the low HU group was **16.9** (3.8 to 74.6)

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Results - Fragility fractures

- Using our cutoff values, **92% of the fragility fractures would be predicted**
- The sensitivity of forearm HU values for fragility fracture risk was **92.3%**
- Negative predictive value of **97.5%**

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Discussion

- HU measurements above 146HU are strongly predictive of normal forearm BMD
- Values below 146HU should prompt immediate referral for BMD assessment
- These measurements are also applicable to central BMD

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Conclusions

- Patients with minimum distal ulnar HU measurements below 146HU were **16 times more likely to sustain a fragility fracture**
- We were able to capture **92%** of future fragility fractures with our cutoff value

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Future directions

- Wrist CT scans are routinely obtained for many indications
- Measuring HU is simple and can be done in less than 1 minute
 - Developing app to perform calculations:

Enter Values

Values may contain decimal points (for example, 187.4). All 3 values are required.

value 1	value 2	value 3
Calculate		
Result		

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Future directions

- Prospective longitudinal study with CT and DXA obtained together
 - Equal males/females
 - Compare cost/benefit of wrist CT
 - Develop multi-disciplinary bone health clinic
- Finally "own the bone"
 - Screen
 - Diagnose
 - Treat
 - Prevent

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