

16.0 UROLOGY

16.1 CONGENITAL ABNORMALITIES OF THE KIDNEYS

Revised: August 18

Reviewed: August 18

This section is meant to address congenital abnormalities commonly encountered in aerospace medicine, however, it is not meant to be an all-inclusive list. Waivers for conditions not specifically listed will be considered on case-by-case basis in designated personnel only.

Significant changes: 1). Deleted requirement for 24 hour urine collection for creatinine clearance

	Applicant	Class I			Class II	Class III	Class IV
		SG 1	SG 2	SG 3			
CD	X	X	X	X	X	X	X
NCD							
WR	case-by-case ¹	case-by-case ²	case-by-case ²	case-by-case ²	case-by-case ²	case-by-case ²	case-by-case ²
WNR							
LBFS	No	No	No	No	No	No	No
EXCEPTIONS							
LIMDU/PEB	Not required.						

1. Waiver considered only on a case-by-case basis.
2. Waivers can be recommended if asymptomatic, normal renal function, and not requiring medical/surgical therapy.

AEROMEDICAL CONCERNS: The condition or its sequelae can adversely affect the flight performance, mission, or safety. Current or history of this condition is disqualifying. Polycystic kidney disease may be associated with hypertension, berry aneurysms of the cerebral arteries, renal stones, infection, or hematuria. Simple retention cysts in the renal cortex may be susceptible to trauma. Medullary sponge kidneys can be associated with hematuria and formation of calculi. Large polycystic kidneys are not compatible with high performance flying because G forces cause the kidney to pull on the pedicle that may result in bleeding. Pain that may be associated with many of the above can be suddenly incapacitating during flight.

ICD-10 CODES:

Q60.0 Renal agenesis, unilateral (absence of kidney, atrophic kidney)

Q61.3 Polycystic kidney, unspecified

Q61.5 Medullary sponge kidney

Q63.1 Lobulated, fused and horseshoe kidney

N28.89 Other specified disorders of kidney and ureter

SERVICE MEMBER MUST COMPLETE PRIOR TO INITIATING WAIVER

- Released from *Nephrology and Urology* care with recommendation of return to flight status and no restrictions **documented** on last clinical note (electronic or paper).
- If *Nephrology and Urology* recommends restrictions, then documentation of physical and/or mental limitations and expected duration (permanent vs temporary).
- *Nephrology and Urology* recommendation for follow on care **documented** on last clinical note (electronic or paper).
- Surgery/Procedure Note (if applicable, electronic or paper).
- Copies of prior PEB if related to diagnosis.
- Email or provide administrative information to include command UIC, command address,

personal address, phone number, designator, flight hours (total and last 6 months), primary aircraft flown, and years of service.

AEROMEDICAL SUMMARY REQUIRED DOCUMENTATION BY AEROMEDICAL OFFICER
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All associated documentation.

FOLLOW UP REQUIREMENTS	Annual Submission
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Specialist Evaluation: Urology or nephrology follow-up

Labs: As recommended by specialist

Imaging: As recommended by specialist

Flight Surgeon Comment: With respect to symptoms, need for any therapy including medications, adverse effects of therapy

APPENDICIES

References:

Davis, J. R., Johnson, R., Stepanek, J., & Fogarty, J. A. (Eds.). (2008). *Fundamentals of Aerospace Medicine*. Philadelphia: Lippincott Williams & Wilkins.

National Kidney Foundation. (2002). *KDOQI Clinical Practice Guidelines for Chronic Kidney Disease: Evaluation, Classification, and Stratification*. Retrieved from http://www2.kidney.org/professionals/KDOQI/guidelines_ckd/toc.htm

16.2 HEMATURIA

Revised: August 18

Reviewed: August 18

	Applicant	Class I			Class II	Class III	Class IV
		SG 1	SG 2	SG 3			
CD	X	X	X	X	X	X	X
NCD							
WR		case by case ¹	case by case ¹	case by case ¹	case by case ¹	case by case ¹	case-by-case ²
WNR	X						
LBFS	No	No	No	No	No	No	No
EXCEPTIONS							
LIMDU/PEB	Not required.						

1. Waiver considered on case by case basis after work-up complete and etiology discovered.

AEROMEDICAL CONCERNS: The condition or associated underlying condition(s) can adversely affect the flight performance, mission, or safety. Current hematuria, pyuria, or other indicators of urinary tract disease are disqualifying. Hematuria may be a sign of significant underlying renal and/or urinary system disease.

ICD-10 CODES:

R31 Hematuria

R31.2 Other microscopic hematuria

SERVICE MEMBER MUST COMPLETE PRIOR TO INITIATING WAIVER

To determine if the blood in urine is CD or NCD:

1. Screen with dipstick.
2. If positive, ensure no exercise for 48 hours and member is well-hydrated, then repeat.
3. If there are 3 or more RBCs on microscopy, screen for benign causes: infection, menstruation, vigorous exercise, viral illness, trauma, or recent urological procedures, and repeat screen after benign cause removed; if none, hematuria is CD and requires urology consultation and waiver.
 - a. Obtain urine culture, CMP, and CT of the abdomen/pelvis with and without contrast (r/o GU mass) and send these results with member for urologic consultation.
 - (1) If there is contraindication to CT such as CKD, contrast allergy, or pregnancy, a magnetic resonance urography with and without contrast is an acceptable alternative.
 - b. If an etiology for hematuria is discovered, a waiver for that condition will also be required.

If the blood in urine is found to be CD, the following must also be true prior to waiver submission:

- Released from urology care with recommendation of return to flight status and no restrictions **documented** on last clinical note (electronic or paper).

- If urology recommends restrictions, then documentation of physical and/or mental limitations and expected duration (permanent vs temporary).
- Urology recommendation for follow on care is **documented** on last clinical note (electronic or paper).
- Surgery/Procedure Note (if applicable, electronic or paper).
- Copies of prior PEB if related to diagnosis.
- Email or provide administrative information to include command UIC, command address, personal address, phone number, designator, flight hours (total and last 6 months), primary aircraft flown, and years of service.

AEROMEDICAL SUMMARY REQUIRED DOCUMENTATION BY AEROMEDICAL OFFICER
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All associated documentation.

FOLLOW UP REQUIREMENTS	Annual Submission
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Specialist Evaluation: Urology follow-up

Labs: as indicated by specialist

Imaging: as indicated by specialist

Flight Surgeon Comment: with respect to symptoms, need for any therapy including medications, adverse effects of therapy

APPENDICIES

References:

Davis, J. R., Johnson, R., Stepanek, J., & Fogarty, J. A. (Eds.). (2008). *Fundamentals of Aerospace Medicine*. Philadelphia: Lippincott Williams & Wilkins.

American Urological Association. (2012). *Diagnosis, Evaluation and Follow-up of Asymptomatic Microhematuria (AMH) in Adults: AUA Guideline*. Retrieved from <http://www.auanet.org/education/guidelines/asymptomatic-microhematuria.cfm>

16.3 PROSTATITIS

Revised: August 18

Reviewed: August 18

	Applicant	Class I			Class II	Class III	Class IV
		SG 1	SG 2	SG 3			
CD	X	X	X	X	X	X	X
NCD							
WR		case by case ¹	case by case ¹	case by case ¹	case by case ¹	case by case ¹	case-by-case ²
WNR	X						
LBFS	No	No	No	No	No	No	No
EXCEPTIONS							
LIMDU/PEB	Not required.						

1. Waiver can be recommended if asymptomatic and normal renal function

AEROMEDICAL CONCERNS: The condition or its treatment can adversely affect the flight performance, mission, or safety. Current acute prostatitis or chronic prostatitis is considered disqualifying. Prostatitis may be acute or chronic and may involve symptoms such as severe perineal discomfort, backache, urgency and frequency of micturition which can be extremely distracting in the cockpit. The side effects of some medications are not compatible with flying.

ICD-10 CODES:

N41.0 Acute prostatitis

N41.1 Chronic prostatitis

SERVICE MEMBER MUST COMPLETE PRIOR TO INITIATING WAIVER

- Released from *IM or urology* care with recommendation of return to flight status and no restrictions **documented** on last clinical note (electronic or paper).
- If *IM or urology* recommends restrictions, then documentation of physical and/or mental limitations and expected duration (permanent vs temporary).
- *IM or urology* recommendation for follow on care **documented** on last clinical note (electronic or paper).
- Surgery/Procedure Note (if applicable, electronic or paper).
- Copies of prior PEB if related to diagnosis.
- Email or provide administrative information to include command UIC, command address, personal address, phone number, designator, flight hours (total and last 6 months), primary aircraft flown, and years of service.

AEROMEDICAL SUMMARY REQUIRED DOCUMENTATION BY AEROMEDICAL OFFICER

All associated documentation.

FOLLOW UP REQUIREMENTS

Annual Submission

Specialist Evaluation: IM or urology follow-up

Labs: As indicated by specialist

Imaging: As indicated by specialist

Flight Surgeon Comment: With respect to symptoms, need for any therapy including medications, adverse effects of therapy

APPENDICIES

References:

Meyrier, A., & Fekete, T. (2015). Chronic bacterial prostatitis. In S. Calderwood, and A. Bloom (Eds.), *UpToDate*. Retrieved from http://www.uptodate.com/contents/chronic-bacterial-prostatitis?source=search_result&search=prostatitis&selectedTitle=2%7E95

16.4 BENIGN PROSTATIC HYPERTROPHY

Revised: August 18

Reviewed: August 18

Significant changes: 1). Added AUA-SI score sheet and incorporated into CD/NCD differentiation. 2). Changed consultation requirement to IM or urology

	Applicant	Class I			Class II	Class III	Class IV
		SG 1	SG 2	SG 3			
CD	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹	X ¹
NCD							
WR	case by case ²	case by case ³	case by case ³	case by case ³	case by case ³	case by case ³	case by case ³
WNR							
LBFS	No	No	No	No	No	No	No
EXCEPTIONS							
LIMDU/PEB	Not required.						

1. The condition is considered disqualifying based on the clinical/treatment criteria detailed below.
2. Waivers are considered on a case-by-case basis if AUA-SI <8 and not requiring medications.
3. Waiver s are recommended if symptoms are controlled on acceptable therapy as detailed below.

AEROMEDICAL CONCERNS: The condition or its treatment can adversely affect the flight performance, mission, or safety. The conditions associated with significant BPH, include symptoms, sequelae, and treatments that are considered disqualifying. Current significant BPH and its treatments are considered disqualifying. BPH is a universal condition in men as they age and is initially characterized by a decrease in the force of the urine stream beginning as men reach their 40's or 50's. In the older aviator, BPH may result in urethral obstruction to the extent that they experience bladder emptying difficulty and urinary frequency, have increased risks of prostatitis with a longer and more complicated recovery, and interrupted sleep cycles from nocturia that can contribute to fatigue. The two primary classes of medications used in the non-surgical management of BPH have varying side effects; postural hypotension, reduced G-tolerance and visual changes are among the most significant aeromedical concerns. Many of the non-selective alpha-1 adrenergic antagonists act on vascular receptors resulting in postural hypotension, dizziness and visual changes which are incompatible with aviation duty. Urologic subtype selective alpha-1 adrenergic antagonists, which act on subtype alpha-1 adrenergic receptors specific to the prostate smooth muscle, provide symptomatic relief while minimizing other adrenergic side effects. Medications such as decongestants may exacerbate bladder emptying difficulties due to increased urethral constriction. Other medications can compete with hepatic cytochrome P450 elimination of BPH medications resulting in delayed clearances and increased side effects.

ICD-10 CODES:

N40.0 Benign prostatic hyperplasia

SERVICE MEMBER MUST COMPLETE PRIOR TO INITIATING WAIVER

To determine if BPH is CD or NCD:

1. BPH is NCD if:
 - a. AUA-SI score is <8 AND
 - b. DRE is not concerning AND
 - c. PSA is within reference range AND

- d. Watchful waiting (per AUA guidelines) is the chosen treatment
2. BPH is CD if:
 - a. AUA-SI is ≥ 8 OR DRE is concerning OR PSA is above reference range

If BPH is CD as above, the following will also apply to designated personnel:

1. IM or Urology consultation required
2. After surgical treatment, including open prostatectomy, transurethral (such as TURP/TUMT/TUVP), and transrectal procedures by urologic surgeons and specialists, full post procedure recovery with symptom resolution is achieved and member is found fit for full duty and cleared to return to normal activities by the surgeon. Operative reports must be submitted in support of waiver request.
3. After non-surgical management of BPH with approved medications as listed below, symptom resolution is achieved on stable dose of medication without adverse effects for a minimum of 30 days before applying for a waiver.
 - a. Non-selective alpha-1 adrenergic antagonists: doxazosin (Cardura®), prazosin (Minipress®), terazosin (Hytrin®) are CD, no waiver recommended.
 - b. Selective alpha-1 adrenergic antagonists: alfuzosin (UroXatral®), tamsulosin (Flomax®), silodosin (RAPAFLO®) are CD, waiver not considered for Service Group 1 or 2, or tactical NFO personnel. Senior officers (LCDR and above) may be waived to Service Group 3 or Class II flying duties in non-tactical aircraft. Designated Naval aircrew will be considered for waiver. Aviation personnel on these medications – alfuzosin, tamsulosin, silodosin - should not pull more than 2.5 Gs, so requests for waivers should state “transport/maritime/helo aircraft only.” Air traffic controllers will usually be waived if they meet requirements. Patients are required to be on a final stable dose for 30 days without adverse side effects prior to waiver request/submission.
 - c. 5-alpha reductase inhibitors: dutasteride (Avodart®), finasteride (Proscar®) are CD: waivers are possible after 30 days on a final stable dose, without adverse side effects.
4. Any interruption in medication treatment will require a non-flying status until 30 days after the member is back on a stable therapeutic dose.

In addition to above, the following must also be true prior to waiver submission:

- Released from IM or Urology care with recommendation of return to flight status and no restrictions **documented** on last clinical note (electronic or paper).
- If IM or Urology recommends restrictions, then documentation of physical and/or mental limitations and expected duration (permanent vs temporary).
- IM or Urology recommendation for follow on care **documented** on last clinical note (electronic or paper).
- Surgery/Procedure Note (if applicable, electronic or paper).
- Copies of prior PEB if related to diagnosis.
- Email or provide administrative information to include command UIC, command address, personal address, phone number, designator, flight hours (total and last 6 months), primary aircraft flown, and years of service.

<p>AEROMEDICAL SUMMARY REQUIRED DOCUMENTATION BY AEROMEDICAL OFFICER</p>

All associated documentation.

Include the [American Urological Association – Symptom Index \(AUA-SI\)](#) – uploaded to AERO.

FOLLOW UP REQUIREMENTS	Annual Submission
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Specialist Evaluation: IM or urology follow-up

Labs: As indicated by specialist

Imaging: As indicated by specialist

Flight Surgeon Comment: With respect to symptoms, need for any therapy including medications, effectiveness of therapy, adverse effects of therapy, AUA-SI score sheet

APPENDICIES

References:

American Urological Association. (2014). *American Urological Association Guideline: Management of Benign Prostatic Hyperplasia (BPH)*. Retrieved from <https://www.auanet.org/education/guidelines/benign-prostatic-hyperplasia.cfm>

16.5 REITER'S DISEASE

Revised: September 15

Reviewed: September 15

Significant change: please see section titled Reactive Arthritis in Miscellaneous Section

16.6 RENAL STONES

Revised: August 18

Reviewed: August 18

Significant changes: 1). Deleted requirement for 3 sets of blood chemistries (not supported by clinical guideline); 2). Added Sodium, potassium, pH to 24 hour urine determinations (per clinical guideline); 3). Retained stones in designated clarified: WNR; 4). Added IM or Urology consult to designated work-up; 5). Deleted recurrent stone in designated as a reason to find NCD; 6). Added follow-up requirements 1-4 for waiver renewal.

	Applicant	Class I			Class II	Class III	Class IV
		SG 1	SG 2	SG 3			
CD	X	X	X	X	X	X	X
NCD							
WR	case by case ¹	case by case ^{2,3}	case by case ^{2,3}	case by case ^{2,3}	case by case ^{2,3}	case by case ^{2,3}	case by case ^{2,3}
WNR							
LBFS	No	No	No	No	No	No	No
EXCEPTIONS							
LIMDU/PEB	Not required.						

1. Waivers are considered on a case-by-case basis; waivers are generally not recommended for:
 - Recurrent stones <60 months apart
 - Cysteine stones
 - Hypercalciuria (absorptive, type one and type three)
 - Retained stones (collecting system)
2. Waivers are generally recommended if asymptomatic and stone was:
 - Calcium oxalate, calcium phosphate, uric acid, struvite stone
 - Recurrence greater than 12 months
3. Waivers are considered, but generally not recommended for:
 - Cysteine stones
 - Hypercalciuria (absorptive, type one and type three)
 - Retained stones (collecting system)

AEROMEDICAL CONCERNS: The condition is known to produce unpredictable symptoms that can adversely affect the flight performance, mission, or safety. Current or history of a urinary tract stone formation is considered disqualifying. In-flight incapacitation secondary to the pain of renal colic is the major concern. Renal colic has been associated with USAF, IATA, and US airline pilot distraction/incapacitation. The majority of renal stones is associated with dehydration and occurs as single episodes. Retained, asymptomatic stones are a concern because approximately 1/3 of those will become symptomatic in the future.

ICD-10 CODES:

N20.0 Calculus of kidney

SERVICE MEMBER MUST COMPLETE PRIOR TO INITIATING WAIVER

Applicant:

1. Stone free for 1 year prior to waiver application date
2. Urinalysis. See [Metabolic Workup Worksheet](#)
3. Blood chemistries. See [Metabolic Workup Worksheet](#)
4. 24 hour urine metabolic workup. See [Metabolic Workup Worksheet](#)
5. Stone analysis (if stone recovered)

6. Urology consult
7. Non-contrast (stone protocol) CT
8. KUB is required at the time of application to an aviation training program

Designated:

1. Urinalysis. See Metabolic Workup Worksheet
2. Blood chemistries. See Metabolic Workup Worksheet for required labs.
3. Non-contrast (stone protocol) CT
4. 24 hour urine metabolic workup. See Metabolic Workup Worksheet
5. Stone analysis (if stone recovered)
6. IM or Urology consult
7. An episode may be considered NCD only IF...
 - a. This is FIRST stone AND
 - b. The stone is SINGLE AND
 - c. There is NO retention of stone (confirmed by imaging) AND
 - d. All labs on Metabolic Workup Worksheet are NORMAL (as the ranges are defined on the worksheet) AND
 - e. Spontaneous passage of stone
 - f. THEN this episode of stone is NCD for designated personnel
8. Member must be grounded for:
 - a. 2 weeks following spontaneous passage
 - b. 4 weeks following stone manipulation/lithotripsy
 - c. 12 weeks following open surgery and must be found fit for full duty by urology (GROUNDING PHYSICAL REQUIRED SINCE MINIMUM IS GREATER THAN 60 DAYS). Cannot be returned to flight until waiver granted by PERS / CMC

Unless stone is NCD, in designated, as above, the following must also be true prior to waiver submission:

- Released from *IM or Urology* care with recommendation of return to flight status and no restrictions **documented** on last clinical note (electronic or paper).
- If *IM or Urology* recommend restrictions, then documentation of physical and/or mental limitations and expected duration (permanent vs temporary).
- IM or Urology* recommendation for follow on care **documented** on last clinical note (electronic or paper).
- Surgery/Procedure Note (if applicable, electronic or paper).
- Copies of prior PEB if related to diagnosis.
- Email or provide administrative information to include command UIC, command address, personal address, phone number, designator, flight hours (total and last 6 months), primary aircraft flown, and years of service.

AEROMEDICAL SUMMARY REQUIRED DOCUMENTATION BY AEROMEDICAL OFFICER
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All associated documentation.

Include the [Renal Stone Metabolic Worksheet \(WS-RENAL\)](#) – uploaded to AERO.

FOLLOW UP REQUIREMENTS	Annual Submission
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1. Brief summary of previous stone history, work-up and prevention steps.
2. Flight Surgeon comment with respect to symptoms, interval history of additional kidney stone(s), detailed account of additional episode(s), and treatment and prevention steps

taken for additional episodes (Urology consult included). Nephrology consultation if not obtained previously and there has been a recurrence of stone.

3. Radiologic evidence demonstrating no new stones and no growth or movement of retained parenchymal stones, if present. A KUB is recommended for routine follow-up in the absence of symptoms during the waiver period. A non-contrast (stone protocol) CT may be necessary if the patient has a history of radiolucent stones (such as uric acid stones) or if the patient has experienced symptoms.
4. If member is on prevention medication or the initial 24-hour urine stone risk analysis was abnormal, then an annual 24-hour urine to monitor impact of intervention is required.

APPENDICIES

References:

- American Urological Association. (2014). *Medical Management of Kidney Stones: AUA Guideline*. Retrieved from <https://www.auanet.org/education/guidelines/management-kidney-stones.cfm>
- Davis, J. R., Johnson, R., Stepanek, J., & Fogarty, J. A. (Eds.). (2008). *Fundamentals of Aerospace Medicine*. Philadelphia: Lippincott Williams & Wilkins.

16.7 PROTEINURIA

Revised: August 18

Reviewed: August 18

	Applicant	Class I			Class II	Class III	Class IV
		SG 1	SG 2	SG 3			
CD	X	X	X	X	X	X	X
NCD							
WR	case by case ^{1,3}	case by case ^{2,3}	case by case ^{2,3}	case by case ^{2,3}	case by case ^{2,3}	case by case ^{2,3}	case by case ^{2,3}
WNR							
LBFS	No	No	No	No	No	No	No
EXCEPTIONS							
LIMDU/PEB	Per nephrology recommendation.						

1. Waiver considered on a case-by-case basis if:
 - Protein excretion < 1 gram/day
 - Kidney function is normal
 - No systemic disease (including hypertension)
2. Waiver considered on a case-by-case basis if:
 - Hypertension is well controlled
 - Kidney function is normal
 - Protein excretion is < 2 grams/day
3. Waiver will not be recommended for daily protein excretion > 2 grams/day

AEROMEDICAL CONCERNS: The condition, its sequelae, or its treatment can adversely affect the flight performance, mission, or safety. Current or history of proteinuria (greater than 200 mg/24 hours, or a protein to creatinine ration greater than 0.2 in a random urine sample) is disqualifying. The underlying processes that cause proteinuria can lead to renal insufficiency or failure presenting with signs and symptoms that may include fatigue, susceptibility to infection, edema, and electrolyte disturbances. The underlying processes that cause proteinuria may render the member unfit for military aviation duties.

ICD-10 CODES:

R80.0 Proteinuria

SERVICE MEMBER MUST COMPLETE PRIOR TO INITIATING WAIVER

To determine if protein in urine is CD or NCD:

1. Screen with a urine dipstick.
2. If the dipstick is positive, ensure no exercise for 24 hours and the member is well-hydrated, then repeat.
3. If the repeat dipstick is positive, then obtain a microscopic analysis to rule out false-positive conditions such as infection or stones that can increase numbers of red or white blood cells in urine.
4. If these conditions above are ruled out, then obtain two random urine protein/creatinine ratios temporally separated by 1-2 weeks.
 - a. A first morning urine sample is preferred, but not required (patient collects at home then drops off at laboratory)
 - b. If the ratio of either is ≥ 0.2 , then the condition is CD; the member should be grounded and referred to Nephrology for further evaluation
 - c. If the ratio of BOTH are < 0.2 mg, condition is NCD

If protein in urine is found to be CD, then the following must also be true prior to waiver submission:

- Released from *nephrology* care with recommendation of return to flight status and no restrictions **documented** on last clinical note (electronic or paper).
- If *nephrology* recommends restrictions, then documentation of physical and/or mental limitations and expected duration (permanent vs temporary).
- *Nephrology* recommendation for follow on care **documented** on last clinical note (electronic or paper).
- Surgery/Procedure Note (if applicable, electronic or paper).
- Copies of prior PEB if related to diagnosis.
- Email or provide administrative information to include command UIC, command address, personal address, phone number, designator, flight hours (total and last 6 months), primary aircraft flown, and years of service.

AEROMEDICAL SUMMARY REQUIRED DOCUMENTATION BY AEROMEDICAL OFFICER
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All associated documentation.

FOLLOW UP REQUIREMENTS	Annual Submission
	<ol style="list-style-type: none"> 1. Brief summary of previous proteinuria history, work-up, and prevention steps. 2. Flight surgeon comment with respect to symptoms, current therapy including medication and prevention steps to halt progression, and stability of proteinuria. 3. Nephrology follow-up consultation report. 4. Reports of imaging and lab tests recommended by Nephrology.

APPENDICIES

References:

- Davis, J. R., Johnson, R., Stepanek, J., & Fogarty, J. A. (Eds.). (2008). *Fundamentals of Aerospace Medicine*. Philadelphia: Lippincott Williams & Wilkins.
- National Kidney Foundation. (2002). *KDOQI Clinical Practice Guidelines for Chronic Kidney Disease: Evaluation, Classification, and Stratification*. Retrieved from http://www2.kidney.org/professionals/KDOQI/guidelines_ckd/p5_lab_g5.htm