

## In space and on the moon: Mankind's most remote pharmacies

Christiane Staiger, Neu-Isenburg, Germany  
30th ISHP Congress History of Pharmacy  
Remedy and Society, Wien, Sept 17th, 2009



## July 20th, 1969



Sept 17, 2009

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Pictures: NASA

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## Soviet Union led the space race



- April 12, 1961, First man in space: Juri Alexejewitsch Gagarin (1934-1968)
- June 16, 1963, First woman in space: Valentina Vladimirovna Tereshkova (\*1937)
- August 6, 1961, First man to fly longer than 24 hours: Gherman Stepanovich Titov (1935-2000)
- March 18, 1965, First spacewalk: Alexei Arkhipovich Leonov (\*1934)
- October 13, 1964, First 3-mencrew



Pictures: Wikipedia

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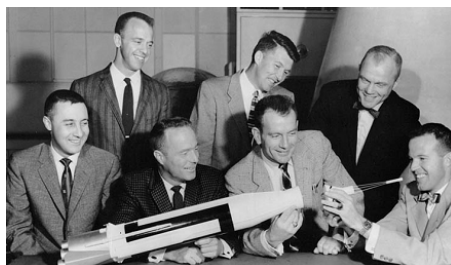
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## USA caught up



- 1961-1963: Mercury program (1-man crews)
- 1965-1966: Gemini missions (2-men crews)
- 1968-1975: Apollo (3-men crews)



L to R: Grissom, Shepard, Carpenter, Schirra, Slayton, Glenn, Cooper.



Pictures: NASA



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## Medical challenges in space



- Weightlessness, "zero g"
  - Motion sickness
  - Liquids act different
- Heavy acceleration and deceleration forces, "g loads"
  - Nausea
  - Desorientation



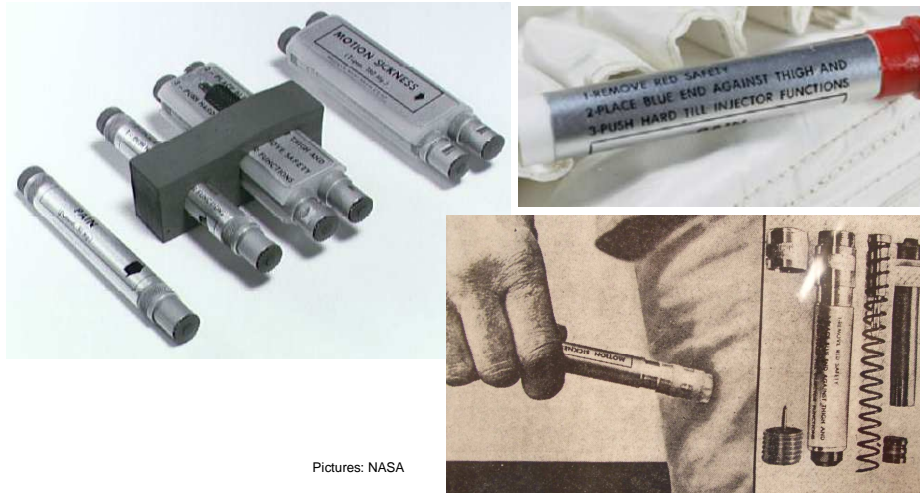
Pictures: NASA

## Mercury medical kit



Picture: NASA

# Astropen



Pictures: NASA

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# Aim of Apollo



Picture: Internet

- "I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the Earth."
- — Pres. Kennedy, May 25, 1961

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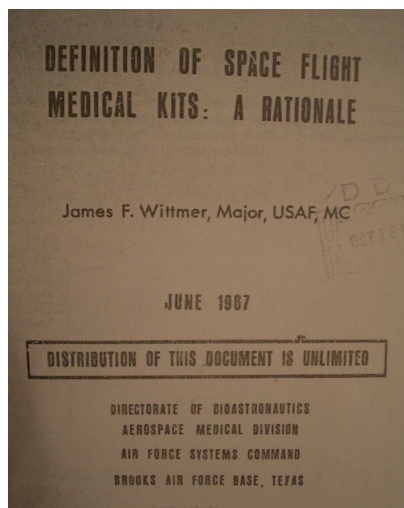
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## Selection of drugs



- June 1967
- Comprehensive report on
  - Diseases and complaints
  - Recommended Drugs
  - Risk Analysis
  - Weight and Volume estimation
  - Priorities



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## Apollo 8



Pictures: NASA

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## Apollo Medical kit contents



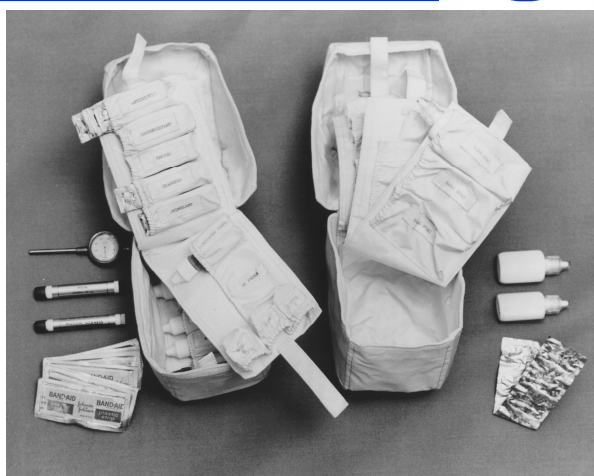
Use	Drug	Dosage and Form	Amount
motion sickness	Cyclizine hydrochloride	45 mg (0.9 cc. in injector)	3
pain	Meperidine hydrochloride	100 mg (0.9 cc. in injector)	3
eyedrops	Methylcellulose solution	one-ounce bottle	2
analgetic	Aspirin	tablets	72
antibiotic	Ampicilline sodium	250 mg tablets	60
	Tetracycline hydrochloride		
nausea	Cyclizine hydrochloride	50 mg tablets	12
stimulant	Dextroamphetamine sulfate	5 mg tablets	12
pain	Meperidine hydrochloride	100 mg tablets	18
decongestant	Tripolidine hydrochloride	2.5 mg tablets	60
	Pseudoephedrine hydrochloride	60 mg tablets	
diarrhea	Diphenoxylate hydrochloride + Atropine	2.5 mg + 0.25 mg (?) tablets	24
sleeping	Secobarbital sodium	100 mg tablets	21
	first aid ointment	bottle	1
	nasal spray	bottle	3
	compress bandage		2
	adhesive bandage		12
	oral thermometer		1
	spare crew biomedical harness		4

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## Apollo Medical kit - 1



Pictures: NASA

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## Apollo Medical kit - 2



Pictures: NASA

## Sojus



Pictures: <http://www.raumfahrtmuseum.at/sojuskapsel.html>



## Space Shuttle STS-95



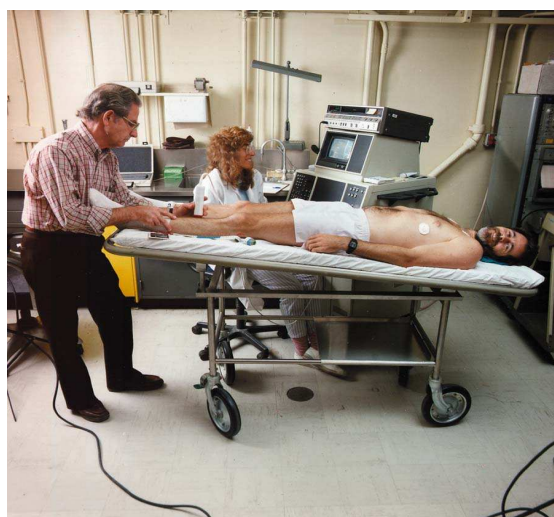
Picture:  
NASA

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## Anti-Orthostatic Bed Rest (ABR) *Ground-based model for microgravity*



Picture: ASGSP -  
American Society for  
Gravitational and Space  
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## Training in Weightlessness



CNES / NOVOSPACE